TELEPHONY ENGINEER

Volume XVI CHICAGO, JULY, 191 No. 1

The Indianapolis Telephone Co

Adopts

The Automatic Telephone

For Its Entire Indianapolis System

This is the largest contract for central office equipment ever placed with any Independent Manufacturer since the Tri-State Telegraph Company converted its manual exchanges in Minneapolis to Automatic.

The reason for the action as stated by the Indianapolis Telephone Co. in its public announcement is as follows:—

Automatic Electric Company

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Three Carbo steel units increase the life of a new pole from eight to twenty-four years.

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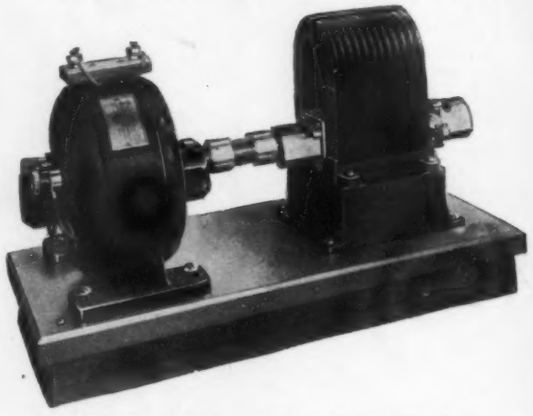
and cut out the expensive battery up-keep



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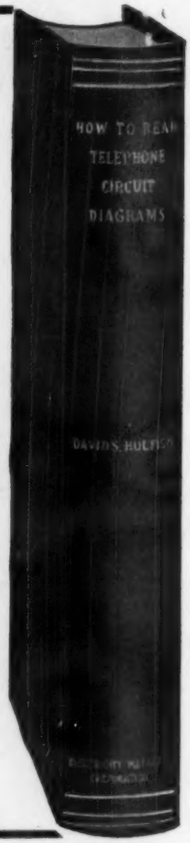
The Holtzer-Cabot Electric Company
Chicago, Ill. & Boston, Mass.

How to Read Telephone Circuit Diagrams

BY DAVID S. HULFISH



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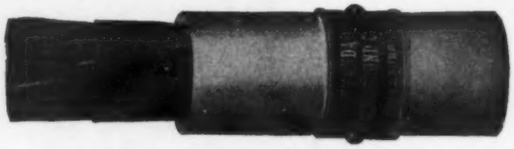
Electricity Magazine Corporation
Monadnock Bldg.,
Chicago, U. S. A.



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Entered at Chicago Post Office as Second Class Mail Matter

Telephone Engineer

WITH WHICH IS CONSOLIDATED
The Western Telephone Journal
ESTABLISHED 1902

PUBLISHED MONTHLY BY
ELECTRICITY MAGAZINE CORPORATION
MONADNOCK BUILDING, CHICAGO, ILL.
Telephone: Harrison 3014—All Departments

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If Your News Dealer Will Not Supply You—Please Notify Us

VOL. XVI — CHICAGO, JULY, 1916 — NO. 1

The Significance of Western Electrics' Withdrawal

IT is probable that the action of the Western Electric Company in withdrawing all sales effort in the Independent field, which policy was announced Saturday, June 17, has no political significance. We have no doubt that—incredible as it may seem to those who always question the Bell word—the explanation given by Vice-President Swope is sincere. He says the shortage of commonly used materials has so embarrassed the big factory that it has abandoned all attempts to supply miscellaneous customers until it is assured it can meet all its obligations to its affiliated customers. Where the demand for certain materials is greater than the supply it is obvious that the Western Electric-Bell contractual relations must demand that the Bell companies be taken care of first. The action, therefore, is apparently born of economic, and not of legal or political necessity.

When the present stringency of supplies is past, and manufacturing processes resume their former movement, the Western Electric Company will again offer its goods to Independent operators. Even at present it will presumably handle what orders it can of Independent companies who insist upon using its equipment. It merely refrains from soliciting new business from Independent operators.

TELEPHONE ENGINEER has long advocated that Western Electric confine its sales to the group of operating companies that own it. We would be glad to think that the present arrangement came as a result of our arguments, and that it would be permanent—since that would enable us to point with pride to our part in the "victory." Calm consideration of the situation, however, shows no cause for such an attitude. The explanation given by the company is more logical than the theory which is fathered by the wish.

No one knows, of course, how soon conditions will restore its former activity to the big Bell factory, and enable it to resume its competitive attacks on Independent business. While the Western Electric is out of it, the Independent manufacturers have the biggest opportunity they have had in ten years. They will be unhampered in their task of winning back the customers who, for one reason or another, or no reason at all, have been buying Bell equipment for Independent systems.

It may be true, as the Bell officials claim, that there is just as great a shortage of materials in Independent factories as there is in theirs. Even so; even if the Independent manufacturers were unable to meet the demands of the business abandoned by Western Electric, the opportunity to regain their allegiance still exists.

Better business for Independent manufacturers must result from the Western Electric's action, whatever the cause of that action. The longer the condition continues the more orders will flow into Independent factories. Even when the Bell plant resumes its general selling campaign, by all the natural laws of business it must lose some customers. And all it loses will be gained by the Independents.

Whether the Independent manufacturers make a success of their opportunity or not depends upon the vigor with which they take advantage of it. If they were now as generous with their sales efforts and their advertising as they were ten years ago, we should feel inspired to predict an immediate return of the old days of Independent prosperity and tremendous activity.

The Independent manufacturers perhaps have had good reason for the gradual dwindling of their sales department and advertising appropriations, which have shrunk to a point far below those of any other industry of equal magnitude. If there has been such reason, it no longer exists. The only competition the Independent manufacturers now have is with each other.

Taking proper advantage of the new opportunity for doubled business means doubled sales effort and doubled advertising. The manufacturers who have the courage and enthusiasm to apply the spurs will realize a return of the good old days of Independent telephone manufacturing prosperity.

What the Newspapers Haven't Learned

NEWSPAPER men, so proverbially alive to the things of the moment and indifferent to the larger truths, are seemingly not yet cognizant of the fact that the telephone is larger than the telegraph. Many a newspaper today, and especially in the effete and erudite east, refers to the big Bell combination as the American Telegraph and Telephone Company, referring to it later in the story as "the telegraph company." Apparently these writers regard the telephone as the company's side line; an ingenious device arranged to use the telegraph wires (during idle moments) for the curious and interesting transmission of the human voice. The company's shares are mentioned as "telegraph stock"; its officers as "well known telegraph magnates."

This is the more extraordinary in that every modern newspaper depends upon the telephone for the quick transmission of all but its most distant news. Editorial offices are among the most abundant users of telephone service there are in a telephone using country.

In the world of nescience that exists in newspaper offices there may be need for more important information than the fact that the telephone is so much bigger than the telegraph that they may be included under one head without changing the total very much. Still, it seems to us that some bright newspaper editor might be able to please the people who know —which includes nearly everybody outside of a newspaper office—by displaying his cognizance of the truth in the matter.

The only reason the Independent telephone industry has not been offended against in this respect is because Independent telephony is never mentioned in newspapers. They do not know it exists. That might be taken as more evidence of newspaper ignorance; but in all justice we are more inclined to blame the Independents themselves for that.

Perhaps, when the United States Independent Telephone Association has established that publicity manager we mentioned last May, the newspapers will begin to realize that the telephone business is actually a good sized business—bigger than the telegraph.

A Demonstration of Operator's Discipline

IN the big Preparedness Parade held in Chicago last month practically every industry of the city demonstrated its enthusiasm and patriotism by marching its hundreds or thousands of workers in amateur, but generally effective, ranks. Among the marchers over the three-mile course were tens of thousands of girls and women, the employes of department stores, shops and offices, who made up in earnestness what they lacked in military formation.

The men, as a rule, were the better marchers—which is only natural and fit. There was, however, one exception, or one group of exceptions, which was so marked as to call forth wondering and delighted comment all along the route. That exception was the girls of the telephone division; the operators of the Chicago Telephone Company's local lines and the American Telephone and Telegraph Company's toll boards.

It is true that these operators had the advantage of some previous training. For some time prior to the parade they had gone through a daily routine of self-imposed drilling in the rest-rooms and yards of their exchanges.

But that slight training alone did not account for the rigid excellence of their discipline, the straight, smooth lines of their marching ranks, the regular sweep of their evolutions. Those manoeuvers are made efficient only by years of accustomed co-operation and useful drilling, through most of which they trained all unconscious.

The Chicago parade was watched from the curb-stone and adjoining windows and roofs by most of the city's two million population. The many who, by patience or enthusiasm, stayed through the whole twelve-hour spectacle, and compared observations for days afterward, were fairly unanimous in their verdict. They said that nothing in the entire demonstration surpassed the operations of the telephone operators. It was an impression to be proud of, and one which, we are confident, was unpremeditated in its superiority. The operators marched best not because they tried to outdo the others in competitive spirit, but simply because they did their utmost and had the unconscious training to guide them.

The moral of all this, of course, is just to corroborate our oft-repeated statement that telephone operating is the best discipline in the world for the rising feminine generation. Its training is so good that we regret there is no equivalent, outside of military camp, for the masculine half of the population.

For girls who aspire to possession of the positive virtues of patience, industry, consideration, courtesy, poise, loyalty, adaptability, helpfulness, efficiency, alertness, and a few others that are but rarely found combined in a single human being, we commend a course of wage-earning by the operating of telephone switchboards. Our only objection to the automatic telephone is that it deprives the world of the best girl-perfector known to science.

Further Thought on a Publicity Department

ANNOUNCEMENT is made by President McVey of the United States Independent Telephone Association, in his report of the recent directors' meeting, that the matter of employing a publicity man, as suggested by TELEPHONE ENGINEER last May, has been referred to the General Survey Committee.

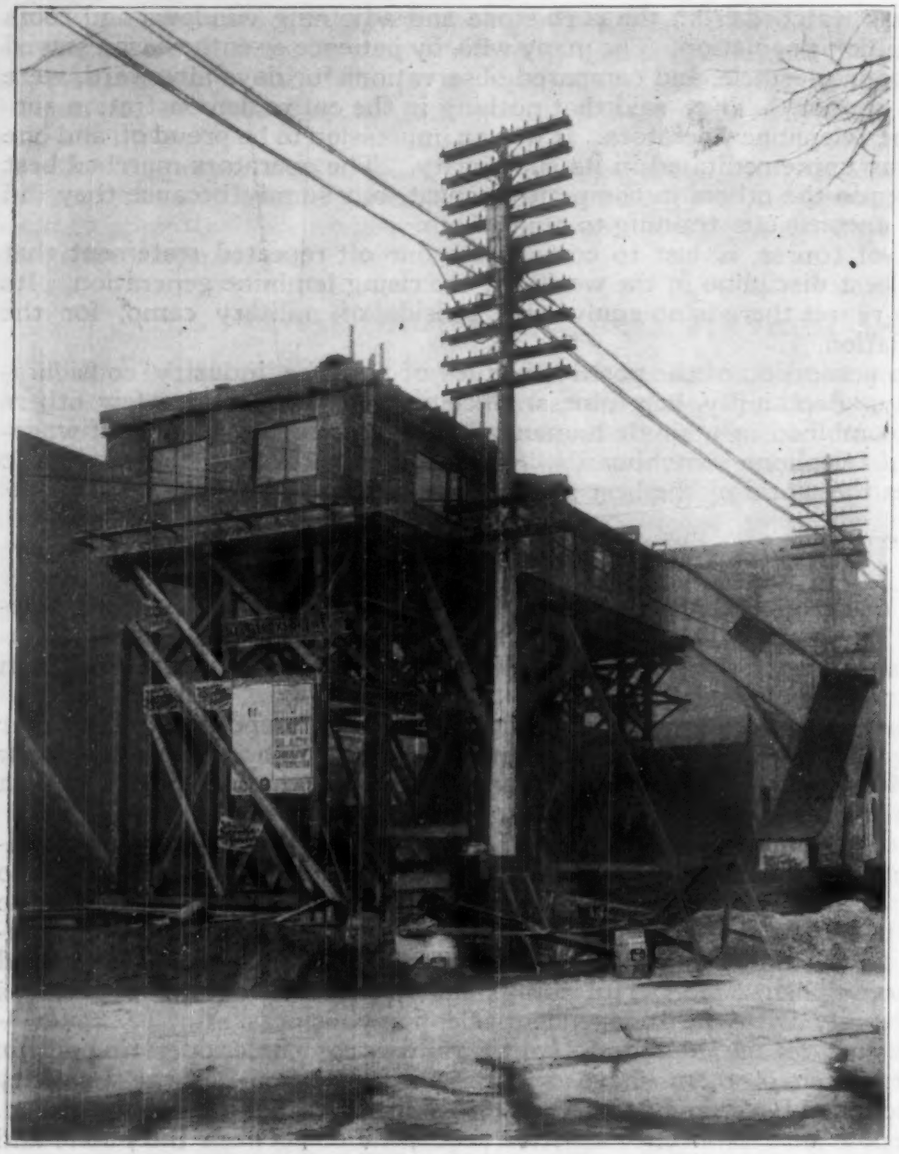
Having brought up this subject and exhausted our supply of logic upon it, it is not our desire to persist in talking about it until it becomes an unwelcome topic. Naturally, our sole object is to aid the Independent cause, and our experience leads us to believe this is a highly effective and quite available method.

Now that the project is definitely before a committee, we trust that it will be considered seriously, and its benefits thoroughly digested before its demerits are discussed. So important do we consider it that, while earnestly disclaiming any attempt to dictate in the matter, we would respectfully urge that the committee consult with other trade and industrial associations who have employed publicity departments. It is a matter of record that some of them have accomplished wonderful things; but none, we venture to say, has equal need or equal opportunity with the Independent telephone business.

An announcement has just reached our desk that the railway companies operating within the state of Illinois—thirty-seven of them—have organized a Bureau of Railway Publicity in charge of Manager Anderson Pace, and located at 38 South Dearborn street, Chicago. The bureau is for the purpose of promoting "a better acquaintance between the public and the railways of Illinois; a better understanding by the railways of what the public wants and thinks; a better understanding by the public of railway needs and problems, and increased co-operation between the railways and those whom they serve." Those purposes, with appropriate changes, would serve an Independent publicity bureau. But our idea of the work is still broader than that; for it includes the education of the public to the fact that there is an Independent telephone industry of national scope. The people know there are railroads; and they know there are telephones—but they think the telephones are Bell.

Probably no single publicity bureau in any industry is doing exactly what we would like to see an Independent telephone publicity bureau do. In no other industry are conditions parallel to those with which we are familiar. But we do not believe the problem is a hard one for an experienced publicity man to overcome, because he has a virgin field and therefore a receptive audience.

The prospect of adding to the already heavy expense of the association demands grave study, we know. But in this case we cannot but regard a publicity department as an investment pure and simple, whose returns will be a benefit not only to the association, but to the whole future history of Independent telephony. We are confident that proper publicity in previous years would have solved many of the problems faced by Independents today, and placed the whole Independent industry on a more assured and more remunerative footing.

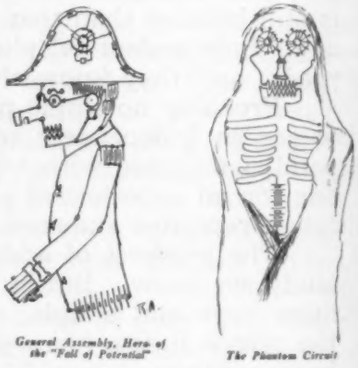


"Up in the Air"—the Youngstown, Ohio, telephone exchange after the old building was torn down. This episode in the history of the company is described by George G. King, Ohio State Manager at Youngstown, in these words: "The Dollar Bank decided to put up an eight-story building. As the cost was too great to move the equipment, we decided to maintain the exchange there while the building was being put up. The tearing down of the old building was done the latter part of the year and the exchange was held up by false work for about sixteen months. This was lowered five and a half feet when the building was completed, and we were then on the second floor, instead of the third. The floor of the original building was left in the switchboard room until we abandoned that building on the 29th day of January, 1916."—Courtesy of the Automatic Telephone.

Telephone Station in No. 1 Mine of the Carnegie Steel Company, at Sygan, Pa.—Courtesy Pittsburgh Industrial Development Commission.

"The Spirit of Service." A Reminiscence of Last Winter From the Southern Telephone News.

"Excuse Me a Moment, O Lord. There's the Telephone."—By Courtesy of "Life."



A Pair of Queer and Ingenious Conceits From the Western Electric News.

STORIES IN PICTURES OF TELEPHONE PRACTICE AND PROGRESS IN ALL PARTS OF THE WORLD.

Training in Woodcraft—Putting up a forest telephone line. "I believe," says George D. Wheeler in the Mountain States Monitor, "that the forest ranger is a closer 'brother in labor' to telephone people than any other. The many thousands of miles of government telephone line under his care bring him very close to us. The interests of his department and those of our company are, in a great many cases, mutual. Our company stands for, and we might say without exaggeration, is, symbolic of development. The many miles of circuit leading to far-away stations on the border of the wild is mute proof of our position. The U. S. forest service stands for the same principle—development."

Telephone City exhibited at N. E. L. A. Convention. One of the exhibits at the convention of the National Electric Light Association that attracted much attention was a large drawing of the buildings of the Chicago Telephone Company grouped to make a telephone city. The drawing embraces the company's 47 office buildings and four other telephone structures, and is a visible manifestation of the size and importance of the telephone industry. In the center of the drawing rises the company's main office building—20 stories in height—the largest telephone building in the world. The other buildings are placed according to their geographic locations in the city and suburbs. In the buildings represented there are 1,370,358 square feet of floor space devoted to switchboard rooms, offices, rest-rooms, storage, etc. To operate this plant about 13,000 persons are employed, of whom 7,000 are telephone operators. The company now has in service more than 540,000 telephones in Chicago and suburbs and the total originating calls average 2,800,000 per day. The "telephone city" picture is the work of H. M. Pettit, a well-known artist.

STORIES IN PICTURES OF TELEPHONE PRACTICE AND PROGRESS IN ALL PARTS OF THE WORLD.

Beaumont, Texas, Ready for Merger

Merger of the properties of the Southwestern Telegraph & Telephone Company and of the Beaumont Telephone Company of Texas and the construction of a three-story telephone building to handle the business of the single exchange is proposed in plans that have been developed by the two concerns. The merger hinges upon the approval of the city council, which must be obtained before consolidation can be effected. The two companies have agreed upon a basis for merger and J. E. Farnsworth, vice president of the Southwestern, has presented the details of this agreement to the council.

In the event the consolidation is effected the company formed to take over the two, or the company which takes over the business, will be called upon to expend about $150,000 in improvements.

In regard to the proposed merger, Mr. Farnsworth made the following statement:

"I am here in reply to a request in the form of a resolution by the council passed some months ago asking the telephone companies to merge, or to relieve the town of two systems. I wanted to come before, but during the last eight months many merger propositions have sprung up over Texas and it was not possible for me to get here. The movement to do away with the double telephone system started in Texarkana. Since that time the companies have merged or are about to merge in the following Texas cities: Texarkana, Clarksville, Abilene, Sherman, Celina, Ennis, Waco, Walnut Springs, Clifton, Marlin, Mart, Temple, Belton, Austin and Houston. In some of these places the Southwestern has taken over the competing companies and in others the competing company has taken over the business of the Southwestern, while in others an entirely new company has been formed. In every other city or town in the state where two companies operate, numbering some seventeen or eighteen, agitation is on for a merger, save in San Antonio. For some reason that city has not requested a merger."

Beating the Merger Agreement

The proposed telephone consolidation at Kearney, Neb., which has been pending for over a year, was the subject of another conference held at the state railway commission's office between members of the commission, Attorney E. M. Morsman for the Nebraska Telephone Company, and President Warren Pratt of the Kearney Telephone Company.

Owing to objections made by the federal department of justice to the Bell company's buying any more competing telephone properties anywhere in the United States, the original plan for the sale of the Kearney company's holdings to the Bell has been abandoned. A consolidation was ordered by the state railway commission a year or more ago, but it never materialized because of the federal government's attitude.

Now the telephone men think they have found a way to bring about the merger without going counter to the agreement between the United States attorney general and the Bell corporation. This is:

1. That the Bell, instead of buying the Kearney company's exchange, shall sell to the latter company its own exchange at that place, together with a toll line from Kearney to Callaway.

2. That the Kearney company, as partial compensation therefor, shall turn over to the Bell company its noncompetitive exchange at Overton, a toll line from Kearney by way of Overton to Lexington and Summer, and another line from Kearney to Lowell.

3. That the Kearney company shall, as additional payment, issue to the Bell company $50,000 of its 6 per cent preferred stock, conditioned upon approval by the railway commission.

In conjunction with the consolidation, the Kearney company has filed an application with the railway commission for an increase of rates which, according to the figures submitted by the company, will aggregate about $7,000 per year of additional revenue.

Sues for County Service at Chicago

Telephone tolls amounting to $2.30, one-half of the amount paid on forty-six calls between Chicago and Oak Park, may lead to changes in rates affecting between 200,000 and 300,000 telephone subscribers, not only in the city but in more than a score of surrounding towns and villages. Myer J. Stein, an attorney living in Oak Park, has sued the Chicago Telephone Company before Justice of the Peace W. Stevens Lewis of Oak Park for that amount. A preliminary hearing was held and the court now has under consideration a motion by the company's attorneys asking that the case be transferred to the state public utilities commission on the ground of lack of jurisdiction of the justice of the peace.

Stein's argument, as shown in the hearing, is that a toll rate of 10 cents a call exists between Chicago and Oak Park except for that portion of Chicago known as Austin, where the toll rate is 5 cents. Stein asserts that one toll rate should exist throughout the city and that to charge different rates constitutes "discrimination." He also asserted that the toll rate to the Lawndale and Rockwell exchanges in Chicago is 10 cents, while to Cicero no toll at all is charged, although these exchanges are all in the same building within the city of Chicago at 3608 Ogden avenue.

Stein is fighting for a 5 cent toll for all calls to Chicago from within Cook county. This would affect the following towns and villages: River Forest, Forest Park, Broadview, Maywood, Melrose Park, Bellwood, Hillside, Berwyn, Lyons, Oak Park, Proviso, Riverside, Stickney, Summit, Argo, Hodgkins, Western Springs, LaGrange, Justice, Spring Forest and Brookfield, with about 75,000 telephone subscribers.

Illinois Town Votes Municipal Plant

A special election held to ascertain whether or not Astoria, Ill., should purchase the Astoria Telephone Exchange and operate it as a municipal plant, resulted in favor of the city buying it, by a big majority.

The election was a spirited one. Automobiles, working for both sides, were busy all day hauling voters to the polls. Everybody seemed to be interested and much enthusiasm was manifested. H. S. Bucher, owner of the exchange, circulated bills setting forth his objections to the city taking over the plant. Citizens favoring the proposition circulated bills explaining why it should be bought, stating that a large revenue would be derived from it each year for city improvements.

The next move to be made is for the city to start condemnation proceedings to acquire the plant, providing a satisfactory agreement cannot be reached with Mr. Bucher for the purchasing of the plant.

Those who use mica products will be glad to have the booklet by that title issued by the Producers Mica Company.

Chicago's Preparedness Parade

The Part the Telephone and Its Operators Played in the Big Demonstration

CHICAGO'S recent preparedness parade was not only the largest parade in the history of the United States, but it was also the best managed parade ever held in Chicago. From beginning to end there was not a hitch nor the slightest confusion, and it was all directed by one man, who did his work by telephone.

The directing officer, Captain Raymond Sheldon, kept in constant touch with the columns of marchers by means of telephone stations scattered along the line of march. There were eighteen stations and each station was in charge of two Chicago Telephone Company men, who received orders from the directing commander and transmitted them to aids on horseback. These in turn conveyed the orders to commanders of divisions and saw that the orders were carried out. As soon as an order had been executed the fact was reported by telephone to Captain Sheldon, who was established in the headquarters of the preparedness parade committee in the Monadnock building.

The telephones at the eighteen stations along the line of march were operated through a private branch exchange at the Harrison office of the Chicago Telephone Company. In addition to the thirty-six Chicago Telephone Company men, who had charge of these telephones, there were four telephone men on duty at headquarters. This force of forty bore the same relation to the preparedness parade that a signal corps bears to an army. Their work enabled the commander to keep in direct touch with over 130,000 marchers in a way that would not have been possible by any other means.

Every telephone station reported when a division reached it, how rapidly it was marching, and when it had passed.

By means of these telephone reports Captain Sheldon and his assistants were able to keep before them at all times a complete picture of the parade. This was done with strips of colored cardboard tacked on a large street map. The divisions were designated by colors and the strips of cardboard were of corresponding colors. The scale of the map was one inch to each one hundred feet, each inch of cardboard strip representing one hundred feet of the parade.

When a division was brought up to the starting position, its cardboard representative was tacked on the map. Then, as the division moved on, the strip of cardboard was advanced along the line of march on the map until the division it represented had reached the disbanding place.

Capt. Raymond Sheldon Directing the Preparedness Parade by Telephone, from his Monadnock Building Office. He Saw Less of the Parade than Anyone in Downtown Chicago.

This system enabled Captain Sheldon to have each division ready on the dot to swing into its scheduled place in the parade and to advance or retard a division, according to necessity, after it had started.

The schedule had been worked out mathematically from reports of organizations as to the number of men they would have in the parade. Computation was made on the basis of the amount of space that would be required for one hundred men. If the telephone reports received during the parade were to the effect that the number in a unit had fallen short of the estimate, then the division following had to be speeded up.

It was estimated in advance that the parade would move at the rate of two miles an hour, but the first division exceeded this speed, proceeding at the rate of two miles and a quarter an hour.

This unlooked-for burst of speed brought in a new element that had to be taken into consideration. By marching faster than schedule the first division would have covered the line of march half an hour ahead of its allotted time had the number in its ranks equaled the estimate. But it happened that the dry goods section, which was in this division, turned out 5,000 more marchers than had been promised and these served to equalize the schedule to some extent, but not entirely.

These facts were noted by the aids and reported over the telephone and the schedule was hastily rearranged to fit the new conditions. Orders were telephoned to bring up the second division ahead of time. This change prevented a break in the parade. While the rear of the first division was passing Van Buren street in Michigan boulevard the second division was marking time in Van Buren street, ready to fall in.

By eleven o'clock, two hours after the parade had started, reports from the telephone stations indicated that the parade had been brought back to the original time schedule. After that the schedule was maintained until evening with variations of from five to ten minutes.

One of the big features of the preparedness parade was the display made by the employes of the Chicago Telephone Company. It consisted of two sections, one of which marched in the forenoon, the others in the afternon.

In the first section were the general officers, employes of the plant, commercial and engineering departments, numbering 4,100 marchers. The afternoon section was made up from the traffic department and included the telephone

operators from the different telephone offices throughout the city. The section numbered 2,300. The total number of telephone employes who marched in the two sections, according to the counting machines, was 6,400.

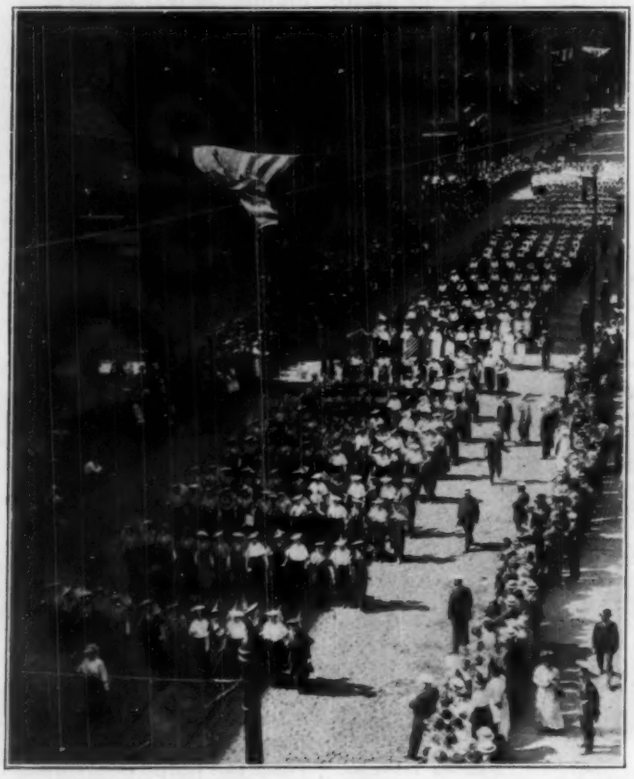
Both the morning and afternoon marchers were headed by the telephone company band and by the general officers of the company. The telephone sections received many compliments from the newspapers, from spectators and from parade managers on their general appearance, their decorations and their special features.

The telephone marchers emphasized their belief in preparedness by organizing in advance. Each individual was thoroughly drilled and then assigned to a specific place in one of the telephone sections of the parade.

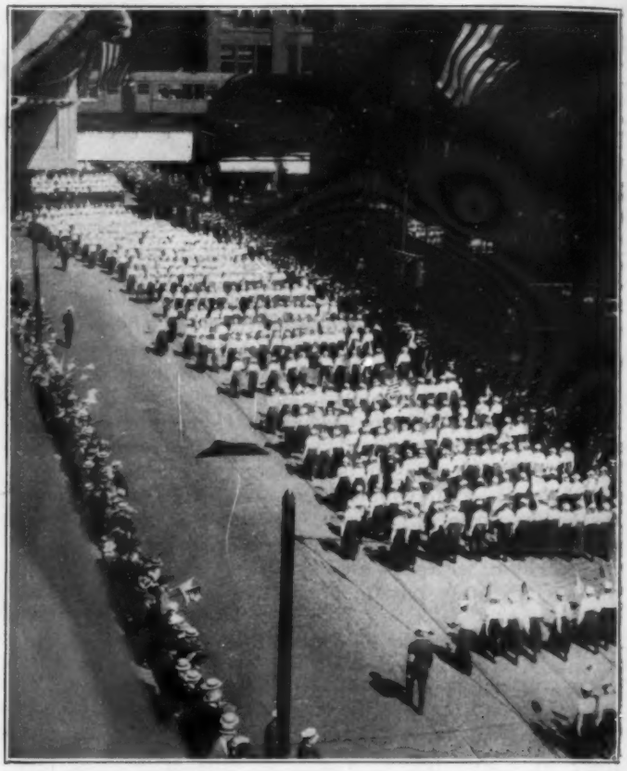
When the subject of taking part in the preparedness parade was first broached to the company a meeting of the general officers was held, and S. J. Larned, general traffic superintendent, was made chairman of a general committee, formed to take charge of the company's participation therein. He selected individuals to look after the work in each department of the organization as follows: W. J. Boyd, general offices; Robert Cline and V. Ray, plant department; W. G. Luscombe, commercial department; A. B. Crunden, accounting department; John Humiston, engineering department; F. A. de Peyster, traffic department.

As a preliminary step, taken for the purpose of ascertaining the number of marchers that the telephone company could furnish, circulars were sent from the offices of the different departments to the employes, asking those who cared to take part in the parade to indicate their desire to do so. The response was practically unanimous. The employes entered enthusiastically into the project.

Each department was then quickly organized into companies and the companies into squads of eight with a sergeant in charge. Officers of the national guard, who are in the employ of the telephone company, and men who have seen service in the army were appointed as drill masters. Each company of sixty-four was given two or three drills on the roof of the telephone building or in a hall that had been secured for that purpose. Operators were drilled at the different exchanges, on the roofs and the tennis courts.



Part of the Operators' Division.



Another View of the Operators on Parade.

The drills were very simple, consisting only of line formations, keeping step and turning corners in company formation. Each individual was given a card with his name, the number of his company and platoon, his number in the line, his captain and his sergeant. By this means the thousands of employes were enabled to assemble at the appointed place and to fall in line without the least confusion.

The front rank of both the morning and the afternoon sections of the telephone employes was formed by the general officers of the Chicago Telephone Company with Bernard E. Sunny, president, the center of the line of sixteen. On each side of him walked the other officers: Alonzo Burt, H. F. Hill, W. I. Mizner, W. R. Abbott, B. S. Garvey, J. G. Wray, Clifford Arrick, A. R. Bone, S. J. Larned, Frank Redmund, W. R. McGovern, H. H. Henry, W. B. Mann, M. J. Carney, and W. E. Bell. The captain of this division was A. S. R. Smith.

One of the features of the afternoon parade that brought much favorable comment was the living flag, composed of 260 young women operators of the American Telephone and Telegraph Company. The flag formation was thirteen walking abreast and twenty deep. Girls in red capes and hats and in white capes and hats formed the stripes, while in one corner for the stars were girls in blue capes and hats with a white star on the top of the cap.

Looking down at this section of the parade from windows above, the illusion of an animated flag was perfect. Besides getting mention in the telegraph dispatches and in the newspapers, the flag girls received invitations to march in other parades, particularly in the suffrage parade which took place a few days later. The girls, who were from the toll operators and the telephone school, were drilled by H. L. Ham, toll manager. They were led by Mrs. O'Hara, chief toll operator.

Another feature was a living reproduction of A. M. Willard's celebrated picture, "The Spirit of '76." This was a fife and drum corps, consisting of Myrtle De Lue, Frank Mack and Kenneth McKenzie. The aged artist, who created the picture, was visiting the city. He viewed the representation of his great picture with interest and posed with the corps for a photograph.

In the morning parade a flag, 15x30 feet, was carried by twenty-four girls from the maintenance department. They had an escort of thirty young women. The flag was carried in a horizontal position, the girls holding it at about waist height. It made an attractive feature for those who were in a position to look down on the parade.

The young women operators were mobilized on special trains on the elevated railroads. Federal street, where they assembled, had been marked off in five-foot spaces. The girls had formed into marching order five minutes after they arrived.

F. A. de Peyster, grand marshal of the telephone section of the parade, and his two aids, L. W. Layton and G. K. McCorkle, headed the parade. Immediately following came thirteen members of the Society of Telephone Pioneers of America. The Chicago Telephone Company band of one hundred pieces, led by E. B. Spearing, resplendent in a drum major's uniform, was next in line. Then followed the general officials and the girls, formed in companies according to the offices.

In both the morning and the afternoon the Chicago Telephone Company fife and drum corps of thirty-eight pieces helped the marchers to keep in step. The glee club of fifty members, led by F. L. Curtis, sang parade songs as they marched.

Enthusiasm of the telephone marchers did not die out with the disbanding of the parade. There is a movement on foot to form a permanent marching body among telephone employes as a result of their preparedness parade experience.

The Future Communication

I was at a dinner in New York recently. We had a wireless telephone from the Arlington tower near Washington to New York, and by means of it speech was heard by all the diners.

We heard the "Star Spangled Banner." That music was sent out by wireless and went all over the earth. More than that, it went off into space.

It was propagated at the velocity of light, and in 45 years—even at that velocity it will take it that length of time to get there—anybody who might be on the North Star could hear that "Star Spangled Banner."

Three thousand years from now, if any of you happen to be around in the vicinity of some of the distant stars of the fifteenth magnitude, you will hear the same "Star Spangled Banner," and if you will tell me how far space extends I will tell you how many years that grand old tune will go resounding throughout the ages.

For we have a conductor that not only connects New York with San Francisco, but this wonderful conductor, the ether, connects up all creation.

One of the difficulties we have with that conductor is in trying to send all the telephonic and telegraphic messages of the world over one wire. That is the problem of wireless telephony—that all mankind must use that one conductor.

Its possibilities in the way of multiplicity, confusion of simultaneous communications, are obvious; but think of the other end of it. Anybody can send up a cry of distress, a cry for help, and it will reach all mankind, wherever they may be located on this earth.

So far as the electrical problem is concerned, there is no reason why any human being could not listen, with a telephone at his ear, and they could all be provided with sufficient current, so that they could all hear at once.

When you think of such possibilities as that you will see that this telephone business is in reality a service of a most transcendent character. It is so big that we puny mortals can form but a poor conception of it.

But there is another thing. The transmission of these waves and the extension of this wonderful conductor is not limited to the earth. It goes into the sky.

We know that wherever light will travel the waves will travel, and at the same rate; and if it should happen that there are other parts of the universe that are inhabited by mortals or immortals, ye have ascertained that we have a conductor, at any rate, that is joining up with the place where they are.

And perhaps some time there will be some new way for communication that this will open up to us.

Maybe we will have some day, when all of this dreadful strife in the world is coming to an end—and let us hope we may hear some day—coming out of the great ether, a great voice announcing the victory of peace and saying: "Peace on earth, good will toward men."

These are some of the thoughts that our experiments and our work with the telephone are capable of producing, and thoughts that are very seriously justified.—JOHN J. CARTY.

Asks Injunction Against Chicago Sale

A bill asking an injunction to prevent the payment of $2,532,000 by the Chicago Telephone Company for the automatic telephone system of the Chicago Tunnel Company has been filed in the federal district court clerk's office.

The bill was filed in behalf of Otto Cullman, a stockholder in the Chicago Telephone Company. He alleges that the proposed payment is being forced on the Chicago Telephone Company by the American Telephone and Telegraph Company as a art of an alleged scheme of the latter to gain a comlete monopoly of the telephone business of the United States.

Mr. Cullman asks in addition to the injunction that the court decree that the stock of the Chicago Telephone Company, owned by the American Telephone and Telegraph Company, must be sold within a reasonable length of time, to be fixed by the court.

He asks also that the court fix a time for the election of directors to supplant the present directors of the Chicago Telephone Company, who he asserts, are dummy directors, and that the American company be forced to relinquish collecting 4½ per cent of the gross earnings of the Chicago company each year.

The bill sets forth that the American company, without legal right, owns 97 per cent of the Chicago company, dominates the latter corporation, electing its directors and compelling it to enter into the alleged illegal contract for the purchase of the automatic system, for which it is liable to heavy fines.

The Buffalo Merger Situation

B. G. Hubbell, president of the Federal Telephone Company, has issued the following statement in connection with the proposed merger of the Federal and Bell Telephone Companies:

This arrangement is of course predicated upon the municipal, state and national permission to merge, and it is perhaps a bit early to discuss the financial terms.

However, the officials of the Federal company have felt a deep obligation to their security holders, particularly to those who in the last two years have purchased its seven per cent preferred stock at par, and in making this agreement the desire of the Federal company has been to offer a Bell security in exchange for Federal securities which will be approximately of equal value and income. As for example, it is proposed to exchange $1,000 par value five per cent bonds which pay $50 a year for $600 par value of American Telephone & Telegraph eight per cent stock which pays $48 a year and which has approximately the same value, American Telephone & Telegraph stock selling for $130 a share.

In the preferred stock we propose to exchange $100 par value of Federal stock for $75 par value of American Telephone and Telegraph stock, the difference in par value being made up in the fact that American Telephone & Telegraph stock is quoted on the New York stock exchange at $130, making the values approximately the same and leaving the preferred stockholder a six per cent investment.

It must not be lost sight of that the Federal company's property reaches in a comprehensive manner to the Buffalo trade limits of western New York, and that a majority of the Federal company's property and a majority of its income is outside of Buffalo's city limits. It would be impossible to segregate the Buffalo property from the whole system. This transaction therefore contemplates the transfer of the entire Federal system to the Bell company.

This step on the part of our company has become necessary because our system in Buffalo has not met with public support. Notwithstanding the fact that since the establishment of the automatic system two years ago the service has been excellent and unusually large sums have been spent for solicitation and advertising the number of Federal subscribers in Buffalo has steadily decreased rather than increased, seriously affecting the income of the company so that today the company is met with the necessity of conveying its property to the Bell company or reorganizing its finances by reducing its bonded debt and fixed charges.

In fact we feel indifference of the public in support of our service during the last two years has been equivalent to a notice to us that competition in this city is no longer necessary or desirable.

The Federal company is not complaining about what it feels is an evolution in public opinion, that is, a change of preference for competition to a preference for state regulation of public utilities for public good. It does assume, however that since it has been unable to obtain support, the logical consummation lies in the sale of its property to the company to which the public has given its support.

The Federal company has accomplished all the public could possibly ask of it during its years of existence, and has more than fulfilled the purpose for which it was organized by assisting to establish extensive and high-class telephone service at reasonable rates. Now that its obligations to the public have been fulfilled it owes a further obligation to its security holders which it has never fulfilled and which, in part, it can now discharge by offering them opportunity to exchange their securities for those of the Bell company on a reasonable, fair and equitable basis, not sufficient, by any means, to pay for the hardships and handicaps under which the Federal company has labored during its existence.

Under these circumstances described we have felt it unwise further to spend money in an effort to get new subscribers and to add to our property and we believe fair consideration of the situation will prompt the public's agreement with us that we are justified in our position.

We are satisfied the Bell company is presenting its proposition to the public in good faith and that no harm can come from the merger. To Bell company's proposed schedule of rates will produce an income considerably less than they would be justified in asking from the public service commission in a rate investigation and the public at large will pay less for telephone service than it is now paying.

In an opinion transmitted to the Buffalo city council Corporation Counsel William S. Rann spiked the agitation of the central council of business men's associations for a municipally operated telephone system, by holding that under existing legislative enactments no authority is conferred upon the city to secure and maintain a municipal telephone system—that is, a telephone plant for public use. If such a system were confined to city offices, he holds, it can be established. But a public system is a different proposition.

Mr. Rann points out that although the charter permits the city to construct and operate municipal waterworks, gas mains, conduits and a lighting system, neither it nor the general laws covers the telephone question. Bearing on this and on the suggestion that the city acquire the Federal plant by preventing the proposed merger and bidding it in, if it is sold, and then operating it in competition with the Bell plant, he writes:

"As the law has been administered in this state, it has generally encouraged competition only where it has found it in existence. It has permitted new competition only where it has been made to appear that non-competitive service has been inadequate or inefficient.

"I think neither the general grant of powers in the home rule act nor the general grant to the city under its charter can be held to be broad enough to authorize the establishment of a municipal telephone system for the purpose of serving the inhabitants of the city."

Physical Connection Dissolution Refused

A motion to dissolve a temporary restraining order against the Cincinnati and Suburban Bell Telephone Company which was enjoined from disconnecting the wires of the Home Telephone Company at the Champion Coated Paper Company's switch-board, Hamilton, Ohio, was overruled in a decision handed down by Judge Harlan. A demurrer which was filed to the petition of the plaintiff company was also overruled by the court.

The action was brought by the Champion Coated Paper Company to enjoin the Bell Telephone Company from interfering with its switch-board, after the defendant had threatened to disconnect the wires of the Home Telephone Company.

The Frankel Connector Company's latest booklet of solderless electrical connectors, testing clips and spark plugs should be in the possession of every telephone, electrical and automobile man. It contains 32 pages of descriptive matter and illustrations.

E. I. du Pont de Nemours & Company has sent out a booklet of Du Pont Products, the booklet itself being bound in the company's product, "Fabrikoid," a leather substitute of excellent quality. The book lists 251 distinct commodities.

Literature sent out recently by the Leeds & Northrup Company includes Bulletin 875, "The Potentiometer System of Pyrometry," and Bulletin 219A, "Galvanometer Lamp and Scale for use with Leeds and Northrup Galvanometers."

The Standard Underground Cable Co. has recently opened a new branch office at 704 Wilkins building, Washington, D. C. Edward Kerschner, formerly with the Philadelphia office, is in charge of the new office.

The Coffey System and Audit Company is installing the Coffey system for the Illinois Telephone Company at Jacksonville, Ill.

Indianapolis Turns to Automatic

Reorganized Indiana Independent Will Abandon Manual System Within Eight Months

ANNOUNCEMENT has just been made by the Indianapolis Telephone Company that it will, within the next eight months, convert its entire Indianapolis system from manual to automatic operation, and that a contract has been entered into with Automatic Electric Company to furnish the required central office apparatus, and also the subscribers' stations to displace the telephones now in service.

This order, the largest placed with any Independent manufacturer since the Tri-State Telephone Company adopted the automatic system for its Minneapolis and St. Paul exchanges, is of great significance to the telephone interests of this country, for it marks the first decisive step toward a comprehensive rehabilitation of the Indianapolis properties. Located in the heart of Indiana, and comprising more than 4,600 miles of toll lines as well as exchanges in Indianapolis and several smaller cities in that region, this system forms a connecting link between the Independent lines that surround it on all sides and binds them together into a united whole.

The Indianapolis Telephone Company has recently undergone a reorganization under the supervision of the Indiana Public Service Commission, and as a result the New Telephone Company, the New Long Distance Telephone Company and the Indianapolis Telephone Company have been merged into a single corporation, under the name of the Indianapolis Telephone Company.

This move has brought about a unified ownership and management of the various hitherto distinct properties, and as set forth in the articles of agreement submitted to the Public Service Commission for approval, the reorganization was undertaken "for the purpose of providing new capital for present additions and improvements; providing means through the stock of a single company for financing future additions and improvements; curing involved intercorporate relations now existing which make impossible or difficult the satisfactory financing of such additions and improvements; simplifying the accounts of the business and also the reports to public authorities and to stockholders and do away with unnecessary boards and officers."

The (new) Indianapolis Telephone Company has outstanding $3,050,000 of stock, $1,900,000 of which is 7 per cent preferred and the balance is common stock. The reorganization has provided a large amount of money for additions and rehabilitations and has reduced the outstanding securities to the extent of $113,600.

But even more important than the financial stability thus secured, is the personnel of the officers and directors who have undertaken the conduct of the enterprise. Consisting for the most part of prominent business men of Indianapolis, and representative of some of the most substantial interests in that section of the country, the board of directors brings to its task a wide and varied experience in many lines of commercial endeavor.

At the head of this group stands William Fortune, president of the Indianapolis Telephone Company, and for many years one of the city of Indianapolis' most prominent citizens. Although but a comparatively young man, he has been engaged in many different activities, all of which have been of a more or less public character. Editorial writer, organizer of various civic bodies such as the Indianapolis Commercial Club and the State Good Roads Movement, official of several large enterprises, and long connected with the affairs of the telephone companies which entered into the new organization, he has been in close touch with the life of Indianapolis, and is especially well fitted to undertake the duties of his office and he brings to it the confidences not only of his colleagues, but of the general public as well.

William Fortune, President of the Indianapolis Telephone Company.

Samuel G. McMeen, One of the Vice Presidents.

Associated with Mr. Fortune as vice presidents are Louis Hollweg, a retired capitalist of Indianapolis who has long been associated with the original companies both as investor and director and who has signified his confidence in this new undertaking by subscribing heavily to its securities, and Samuel G. McMeen, long prominent in telephone affairs, and president of the Ohio State Telephone Company. Charles S. Norton is secretary and Frank D. Stalnaker is treasurer.

The board of directors includes William Fortune, Louis Hollweg, Frank D. Stalnaker, John B. Elam, John N. Carey, Harry S. New, William L. Elder, L. C. Huesmann, George G. Snowden, William L. Moellering, Samuel G. McMeen, F. R. Huntington and Frederick W. Stevens.

It is worth noting in this connection that the new directorate contains the names of several men who, while prominent in other lines of activity, until now have never been active in the telephone business. It was felt

by those in charge of the reorganization of the Indianapolis Companies, that every important business interest in that section of Indiana should be invited to share in the proposed venture, and they consequently brought it to the attention of the most representative men of the city. The cordial reception and hearty cooperation thus secured have done much toward giving the new company its very auspicious start, and the experience and prestige of the men thus associated together insure its continued success.

Thus reorganized and strengthened in its financial affairs, the Indianapolis Company's first step was, naturally, to rehabilitate its equipment so as to place itself in a position to serve its patrons in the most adequate manner. After a very careful investigation, extending over a considerable period of time, and dealing with the subject from every angle, full automatic equipment was adopted since, as set forth in the company's public announcement of its decision.

"In our judgment, in the experience of other successful telephone companies and in the opinion of experts who have made the most thorough investigation, automatic service, as now perfected, is the best telephone service to be had.

"While we have had expert investigation in progress, we have for many weeks had in experimental use a unit of the automatic system between the residence and offices of our directors, and as a result the board of directors of this company voted unanimously for the adoption of automatic service for our subscribers.

"The trend in every walk of life is now toward higher efficiency, faster, surer, safer methods. Just as the stage coach, the scythe and the candle are implements of a past era to which we refuse to return, so does the manual telephone switchboard, with its human factors and human whims to deal with, belong to a past era.

"Modern business and social life demands instant service, sure service and secret service, every day and every night regardless of the stress of calls or the disposition of any human agency. The automatic system, and only the automatic, can provide this."

In the investigation preceding the adoption of the present plans, E. L. Cline, the company's general manager and chief engineer, had a large part, since he was particularly active in studying the technical phases of the various types of equipment considered. He took occasion to observe them in actual operation, visiting for this purpose cities where exchanges were in service, and forming an impartial estimate of the relative efficiency and economy of all the kinds of apparatus on the market.

Associated with Mr. Cline in the technical department of the Indianapolis Telephone Company is H. M. Friendly, who has given particular attention to the automatic operation of long distance lines on the Pacific Coast and more recently with the Ohio State Telephone Company. The presence of two such men as Mr. Cline and Mr. Friendly on the engineering staff of the company is ample assurance of the efficient handling of all the many technical problems that may arise.

With the completion of the rehabilition program now in hand, the Indianapolis Telephone Company will place at the disposal of the City of Indianapolis the most complete and modern system in the world. Capable of expansion to any desired size, and having available cable facilities adequate to meet all immediate needs, there is every reason to believe that from now on the Indianapolis Telephone Company will enjoy the prosperity and esteem which the personnel of its organization and the equipment it will operate so completely deserve.

The Law of Tapping Wires

Lawyers in New York are generally agreed that the opinion of the Appellate Division in the Restmeyer case was practically an indorsement of the right of the police to tap telephone wires for the purpose of detecting crime. In brief, the opinion said that it was not an unlawful or an oppressive use of police power to "interrupt telephone service by arrangement between the police and the telephone company" where the telephone is being used for criminal purposes.

Herman L. Roth said that the law had always sustained the contention of the police that the use of any public service to frustrate criminal acts or in the behalf of the general welfare, was justifiable.

"All the reason that the police need give for tapping a wire," he said, "is a reasonable belief that the act will aid in detecting or preventing crime. Every police captain has a wiretapping outfit, and under general permission from the telephone company he has a right to use it. But this is only in case that his information and belief is to the effect that the tapping is necessary for the public good. Anything that is heard over the wire not relating to crime must not be used in any way. The opinion of the Appellate Division is founded upon good law."

It was said that the opinion may have a direct bearing on the controversy between Mayor Mitchel and the Roman Catholic priests whose wires were tapped and also on the wiretapping indictments in Brooklyn. To these indictments demurrers are to be presented on Tuesday by Commissioner of Charities John A. Kingsbury, and William H. Hotchkiss.

"The law as stated by the Appellate Division," said District Attorney Lewis of Kings county, "is in line with other decisions on the subject. The law plainly permits the police to tap wires only when there is evidence that a crime has been committed or is about to be committed. The Kings county grand jury, which found indictments for the tapping of the wires of the Rev. William B. Farrell and others, was well aware of the law as to wiretapping. The contention of the prosecution in this case is that those who were instrumental in bringing about the tapping of those wires were not justified in doing so, because they did not have information to show that the telephones were being used for unlawful purposes."

Indiana Association Convention in September

The tenth annual convention of the Indiana Independent Telephone Association will be held at the Claypool Hotel, Indianapolis, Indiana, September 14 and 15, 1916. These two dates were decided upon at a meeting of the executive committee held at Indianapolis on June 21. In connection with the convention will be held an operators' school for the two days, which will be in charge of W. S. Vivian.

The association is planning a very interesting program which will attract telephone men to the convention. A copy of the program will be presented here as soon as it is completed.

Directors of U. S. I. T. A. Meet

J. B. Edwards Elected to Succeed L. D. Kellogg Resigned

BY C. Y. McVEY

THE Board of Directors of the United States Independent Telephone Association held a meeting at Hotel La Salle, Chicago, on Monday, June 26, 1916.

There were present Messrs. Adams, Allen, Beam, Casler, Critchfield, Edwards, Fisher, Fuller, Gary, Goodrich, Heller, MacKinnon, McCanne, McMeen, McVey, Parlett, Reber, Robinson, Tarte, Uhl, Vivian and Woods.

Secretary Vivian presented a communication from L. D. Kellogg asking to be relieved of his duties as a director of the association and tendering his resignation. This resignation was accepted and on motion of G. W. Robinson of St. Paul, J. B. Edwards, president of the Kellogg Switchboard & Supply Company, was placed in nomination, and unanimously elected to the directorship.

The applications of 65 companies were favorably acted upon and elected to membership in the association. This makes the membership of the association well towards the 600 mark, which is the largest membership any Independent telephone association has ever had.

Vice-President MacKinnon reported the action of the officers in pursuance of the resolution passed by the Board of Directors at their April 22 meeting instructing the officers to protest to the attorney general against all apparent violations of the so-called Kingsbury Commitment. This action of the officers the board approved.

H. Linton Reber offered the following resolution, which was unanimously adopted by the board:

Whereas, the American Telephone & Telegroph Company, with its subsidiary, the Chicago Telephone Company, proposes to purchase and merge the properties of the Chicago Tunnel Company with the Chicago Telephone Company, and thereby give the Chicago Telephone Company a monopoly of the telephone business in the City of Chicago, and

Whereas, the State Public Utilities Commission of Illinois has given its consent to such purchase and merger, and

Whereas, if such merger and monopoly is perfected by the Chicago Telephone Company in the City of Chicago, it will mean that the only Telephone access to the people of Chicago that the Independent telephone companies of the United States will have, will be through the Chicago Telephone Company, if at all, and if such access is not granted, then it will mean that the Independent telephone companies are shut out of the City of Chicago, and said American Telephone & Telegraph Company will thereby acquire a monopoly of the second greatest telephone field in the United States, and

Whereas, a monopoly under such conditions would be an enormous aid to the American Telephone & Telegraph Company in crushing competition elsewhere in the State of Illinois and other states, and

Whereas, the laws and policies of the United States government is to foster competition and such a monopoly, if granted, would be directly in violation of the anti-trust laws of the United States, and

Whereas, this association now represents all Independent telephone companies in the country having several millions of subscribers and many million other members of the public who may use said telephones, and

Whereas, such a monopoly, if granted, would strike a tremendous blow at the existence of such Independent companies and such policy, if persisted in, would mean the ultimate crushing of all competition with the American Telephone & Telegraph Company and eventually acquire for such company the entire telephone business of the United States, and

Whereas, such a monopoly would be a great detriment to the welfare of the people of the United States, in that it has been thoroughly proven that telephone service is inferior and that rates are higher where such a monopoly exists, and that such a gigantic monopoly as the American Telephone & Telegraph Company now is will be, if such policy is continued, a menace to the safety and welfare to the people of the United States; now, therefore, be it

Resolved, That this Association through its president express these sentiments to the attorney general of the United States, and deliver a copy of his resolution to said attorney general and protest against the merger of said companies or the granting of a monopoly of the telephone field in the City of Chicago, under the conditions of the present Illinois Commission order, and that this association further objects to the adoption of any policy on the part of the government of the United States encouraging or allowing the amalgamation of the American Telephone & Telegraph Company with its competitors, and thereby resulting in a monopoly of any telephone field, unless such field so monopolized shall be thrown open to all telephone companies and subscribers and telephone users for connection therewith under like terms and conditions as those now existing. By this we mean not only that any company desiring physical connection with the Chicago Telephone Company, may have such connection for the purpose of transmitting messages from points on its lines to points in the district of the Chicago Telephone Company, but that any member of the public using a telephone of the Chicago Telephone Company may request and receive connection with any other telephone in the United States if such connection can reasonably be made, regardless of whether said telephone be operated by an Independent or an American Telephone & Telegraph Company.

J. B. Edwards, New Director.

Attention being called to the fact that certain cases were to be published by the Interstate Commerce Commission in its proposed accounting bulletin No. 11 that were protested by the Accounting Committee, Vice-President MacKinnon was instructed to communicate with the Interstate Commerce Commission and request that a further hearing be given before the cases were published.

The Toll Contract Committee appointed to negotiate a contract with the American Telephone & Telegraph Company which would be satisfactory to Independent companies, reported the committee had been informed by the American Telephone & Telegraph Company that as a matter of general policy, it had been decided that the company would make no modifications in the contract already offered. This statement was made after a careful study of toll conditions had been made by committees representing the United States Independent Telephone Association and the American Telephone & Telegraph Company. To the United

States Independent Telephone Association representatives on this committee, the studies had proved conclusively that the plans proposed by the Independent companies were practical. The American Telephone & Telegraph Company made its decision to reject the Association's proposal on the ground of policy rather than from traffic or engineering difficulties.

The committee being unable to carry out the instructions of the Association to negotiate a contract with the American Telephone & Telegraph Company, asked to be discharged, which was done.

In the discussion following the report of the Toll Line Committee, two new committees were authorized: One to make a thorough study of the long-distance connection matter as to ways and means, the other to be known as the General Survey Committee, which will make a study of general telephone conditions throughout the United States. Both of these committees will report their findings and recommendations to the Board of Directors at the earliest possible date.

The new member of the board, J. B. Edwards, was appointed chairman of the Manufacturers' Committee of the United States Independent Telephone Association.

This committee is to make a study of the manufacturing situation, and will report its conclusions and recommendations to the board at an early date.

The matter of employing a publicity man was referred to the General Survey Committee.

Wednesday, Thursday, and Friday, December 6, 7 and 8, have been selected as the dates for the next annual convention. This will be held at Hotel La Salle. October was proposed as a suitable month, but after considerable discussion was rejected in favor of December.

* * *

MEETING OF THE ASSOCIATION'S TRAFFIC COMMITTEE

The men in the picture are, standing from left to right: George K. Gann, general traffic superintendent of the Lincoln Telephone & Telegraph Company, Lincoln, Nebraska; Q. E. Elwell, traffic superintendent of the Ohio State Telephone Company, Columbus, Ohio; W. S. Vivian, secretary-treasurer, United States Independent Telephone Association, Chicago; T. J. June, traffic engineer, Ohio State Telephone Company, Columbus, Ohio.

Sitting down, from left to right are: H. E. Davis, general traffic superintendent, Kansas City Home Telephone Company, Kansas City, Mo.; F. V. Newman, secretary-treasurer, Michigan Independent Telephone and Traffic Association, Grand Rapids, Mich.; W. I. Howard, traffic superintendent, Tri-State Telephone & Telegraph Company, St. Paul, Minn.; C. E. Doolittle, traffic superintendent, Independent Telephone Company, Terre Haute, Ind.

These are the members of the Traffic Committee who attended the last Chicago meeting.

There were five members of the Traffic Committee who could not be present. They were C. C. Deering, secretary of the Iowa Independent Telephone Association, Des Moines, Ia.; E. D. Glandon, president of the Illinois Independent Telephone Association, Pittsfield, Ill.; W. N. McAnge, Jr., secretary of the Southern States Independent Telephone Association, Corinth, Miss.; G. S. Norton, secretary of the Indianapolis Telephone Company, Indianapolis, Ind.; and A. J. Shands, traffic superintendent of the Kinloch Telephone Company, St. Louis, Mo. These are the men who have been working for several months on a problem of compiling a book of operating rules that will be adaptable and acceptable for use by all Independent companies.

In the parts where dual connections have been established it has been necessary for the operator to learn both the Independent and Bell operating methods. It has been the purpose of the committee to eliminate as many of these differences as possible.

A year ago the Ohio State Telephone Company published the most comprehensive set of long distance operating instructions ever issued in the Independent telephone field. These rules were adopted by some of the associations and are now in general use in the states of Pennsylvania, New York, Michigan, Indiana, and Ohio. Considering that these rules were in use in such a large territory and that a great deal of work of an expert character had been performed in the publishing of them, it was thought advisable by the Traffic Committee of the United States Independent Tele-

Traffic Committee Members Present at the Meeting in Chicago May 5 and 6.

phone Association to use them as a basis for any rules which the Association might publish.

The committee has made a detailed comparison of differences between the Ohio State Telephone Company practice and the rules of the Bell Telephone Company. These differences have been tabulated and forwarded to many of the larger Independent companies with a request for their opinions as to which method would be most advantageous to their company's interests. The replies received from the various companies were carefully considered and a question of differences in operating practices were discussed and the great majority of differences eliminated. Such differences as may continue in these books will be only of a minor character. The work as between operators will be almost absolutely uniform.

A sub-committee consisting of Messrs. Newman, Vivian and Tune was appointed to compare the rules for submission to the Service Committee of the Association. The work is being shoved along rapidly and will be ready to be presented to the Service Committee within a very short time. The committee is also busy in preparing a series of bulletins pertaining to a number of traffic matters. These have been assigned to members of the committee as follows:

Route Book, H. E. Davis; Operator's Lessons, Q. E. Elwell; Questions and Answers for Students, taken from the operating rules, F. V. Newman; Peg Counts, Specifications and Observation Forms for Local and Long Distance Work, G. K. Gann; Common Battery Operating Rules, W. I. Howard; Magneto Operating Rules, C. E. Doolittle; Uniform Toll Ticket, W. S. Vivian.

Many of these bulletins were ready for submission to the Traffic Committee at its next meeting, held late in June at Columbus, Ohio, where the committee met at the invitation of the Ohio State Telephone Company.

Rochester Merger Depends on Buffalo

Any move toward a merger of telephone interests in Rochester, New York, will depend upon the result of a referendum now in progress among Buffalo telephone users, George R. Fuller, president of the Rochester Telephone Company, has stated.

The referendum in Buffalo is the outcome of merger conferences begun several weeks ago between officials of the New York Telephone Company and the Federal Telephone and Telegraph Company, the Independent. The idea has the approval of the Buffalo Chamber of Commerce and the newspapers, and the latest step is the census of telephone users.

The fact that the Federal Telephone and Telegraph Company is a large stockholder in the Rochester Telephone Company early led to a belief that Rochester would be affected by the Buffalo conferences. Telephone officials there confirmed that belief, saying that there were few difficulties in the way of a merger if the majority of telephone users desired it.

If the Buffalo majority is for a single system, the Independent company will be absorbed by the New York Telephone Company, if for no other reason than that the latter has by far the greater number of subscribers. Just which company would survive in Rochester is not so easily determined.

It has been reported that the Buffalo negotiations have been conducted on the basis of a swap; that is, the Independents would surrender in Buffalo and take over the New York Telephone Company's plant in Rochester. Whether this is true or not, it has been pointed out, as an argument in favor of such action, that the Rochester Telephone Company has fully as many subscribers as the New York company in the local field, and is admittedly popular.

Wires Tapped by Induction

That it is possible that telephone wires may have been tapped without the knowledge or assistance of the telephone company developed when Assistant District Attorney William Harman Black said he had been told that there was in use in New York City a means of listening in on telephonic conversation without a direct connection with the telephone wire. From a man supposed to be an agent of the German Government Mr. Black said he had learned that the device was being used by the German secret service.

In the complaints of police wiretapping the Thompson Committee and grand juries in New York and Kings county have been investigating, the police have asserted that the telephone company did the cutting in and they did the listening. The possibility of listening to telephonic conversation without the assistance of the telephone company brought renewed attention to the assertions of priests and others who said they were spied on last March, although the police and telephone company knew nothing about it. Some of these persons have also asserted that their wires are still being tapped.

Mr. Black said his informant told him that it was possible to hear conversations some distance away from the telephone wire without a direct connection with it. Mr. Black asked the opinion of several electrical experts who were skeptical that the weak current of a telephone wire could be recorded at any great distance.

Bancroft Gherardi, engineer of the Bell Company, said he had never heard of the use by the telephone company of a wiretapping device which did not involve any direct connection.

Edward F. Chandler, an electrical inventor, said that listening in on telephonic conversation without a direct connection with the wire was something the theory of which was well known to scientists. He said two devices had been used with practical results. He said it would not be possible to use them at any great distance.

The principle involved is that of induction. One way is to wrap a secondary wire about a coil of telephone wire, in which case the current in the telephone wire sets up an opposite and similar current in the secondary coil, the ends of which, attached to a telephone receiver, transmits the conversation.

The second method used was that of paralleling the telephone wire with a coil in which the telephone wire acted as a primary and there was set up a simliar vacillation of current in the coil to that on the wire. This is the same principle as is experienced in "cross-talk" on a telephone wire when two wires run parallel for any distance.

Neither of these systems could be used with practical results except where the listener could get a single wire. That is, they could not be used in tapping one wire where a great number ran together in a conduit. The most practical application would be in tapping telephone wires which ran along ledges of buildings or about windows.

In tapping wires it is not always necessary to cut them, but a length of high resistance could be established and the current forced to flow through a receiver. In this case, however, the wires would have to be bared. However, in the use of the induction coils the insulation about the wires would cut no figure.

European Telephone Development

Translations from the Foreign Press and Communications from European Engineers

BY FRED W. SCHOLZ

SOME time ago a detailed study was made of a semi-automatic telephone system in an exchange equipped for about 4,000 connections, but containing at the time of the tests only about 3,100 actual subscribers. This exchange was one of the first larger exchanges with a great deal of rural service, which introduced semi-automatic service to replace the manual service and the operating results were observed with a great deal of interest. The system is that used and manufactured by the Siemens-Halske Company and is an outgrowth of the automatic system of the same company used in the Munich and Altenburg exchanges, the largest of their kind in Germany and probably Continental Europe. The semi-automatic exchange in Posen shows about the same construction as the full automatic equipment, only that the current impulses, which are necessary for the operation of the different kinds of selectors, are not given by the subscriber with the aid of his number dial but by an operator who uses keys for that purpose.

The method of operation to make a call is about as follows: If a subscriber takes his receiver from the hook, the pre-selector belonging to this line is set in motion. The pre-selector moves, as in the automatic system, to a free I-group selector and makes the connection with it. Each I-group selector has a 25-part trunk selector, which in its construction is similar to the pre-selector, has, however, 25 instead of 10 contact groups (a-, b-, c- line). As soon as a pre-selector has moved to a free I-group selector, the proper trunk line selectors begins to rotate and stops at a free set of keys of an operator. Every operator has two, some even three sets of keys in front of her. These sets consist of each four key strips with ten keys for setting the desired subscriber's number. Each set has also a white lamp as calling lamp and a red one as supervisory lamp.

If a trunk selector has connected to a free set of keys, the subscriber's line is connected with the I-group selector, from whose feed relay bridge the subscriber's microphone receives telephone current, and the operator is connected in parallel by way of the trunk selector. At the same time the white lamp lights and the operator answers in the usual manner. She has no movement to make at first, as her answering outfit is connected to the calling subscriber automatically. As soon as the subscriber has given her the desired number, the operator presses down the corresponding keys of her set of keys, whose white lamp is lighted. The individual keys of each set release each other automatically, so that only the key of the number set remains pressed down. Up to the pressing down of the unit key, which is always the last one to be pressed, the entire number called can be checked by the operator. Only when the last unit key is pressed down, the entire set moves to make the right connection, sending the current impulses to the I-group selector. The current impulses are given in the same order corresponding to the numbers pressed down by the operator, the action being exactly the same as that of the automatic system, where the subscriber himself makes the connection. While the set of keys runs its series of impulses, the calling subscriber is disconnected, so that the current impulses will not balance by way of his subscriber's set. The exchange operator also is free, while these current impulses run off, so that she can take care of other calls.

The distribution of calls to various operators is so regulated that first all of the switchboards supplied with operators receive incoming calls. If the number of calls is greater than that of operators, the second sets of keys at the different places also receive the incoming calls. If there are, say, ten operators, twenty calls can be cared for, if each operator's place is provided with two sets of keys. If a still larger number of calls come in, the surplus calls reach a special lamp panel, the so-called controlling panel. The number of lamps burning in this control panel will always show the supervisor whether there are enough operators for the service or not. The calls stored at this control panel are automatically switched to the first free set of keys offering.

The setting of group and line connectors is the same as in the automatic system. Also the disconnecting and registering of finished calls is done exactly like the automatic system. The entire equipment has been designed so that in going over to the full automatic system in the future, only the trunk selectors need be cut out. Moreover both automatic and semi-automatic systems can be operated side by side without interference.

We come now to the practical operating results obtained with the semi-automatic system in this exchange. The curves shown in Fig. 1 show clearly how the service was distributed among the various hours of the day, and also how many operators were busy throughout the day. The curves drawn on various days almost agree, so that we may count the operating results as practically normal. The operator curve follows the call curve very closely, if we assume the normal capacity of an operator 450 calls per hour. These numbers give an idea of the number of calls cared for by the operators and have been registered by the automatic registering apparatus. The counters are so arranged that they move on by one number, when the operator has finished a call by pressing down the various keys. If conclusions are to be drawn from these numbers as to the calls made by subscribers, we would have the following method:

The calls made by the contract subscribers are given from the position of the individual registers. It was found that these 1,700 subscribers made on the average 4,700 calls per day, or 2.7 calls per day per line. The total of connections made per day by the operators is 40,300 and of this number about 17 per cent, or 6,800 calls, go to "busy" reports and about 4,000 calls to such calls as are never completed and lead to no conversation. These latter cases would include unintentional calls in traffic between inter-office telephones and main exchange, the removal of receiver from hook by mistake, forgetting to hang up receiver, etc. The percentage of "busy" reports was found partly through automatic registration, partly through special observation. There remain then about 30,000 calls that really led to conversations. If we deduct from these the conversations by contract subscribers, there remain then 25,300 calls for the pay stations and those who pay by calls, equivalent to 18 calls per subscriber per line. The average number of calls for all types is about 9.6.

When the exchange was first opened, the answering part of the exchange was divided into three groups of answering operators, which corresponded to the three thousand groups of the subscribers' lines and were conditioned by the use of ten-part trunk selectors. Later 25-part trunk selectors were connected, and the group division was eliminated. Here then was a good opportunity to study the influence of the group division on telephone traffic.

Although the various thousand-groups were fairly evenly divided by the use of the intermediate distributor (each 500 contract subscribers and 500 call-pay subscribers), differences showed in the load on the different groups. The curves shown in Fig. 2, taking in a period of two days, prove how irregularly the traffic is distributed in the various groups during the hours of peak traffic and how differently the groups are busy on different days. Here is seen clearly how the economy of a system is influenced by the size of the groups, and that only larger groups may hope to have a fairly uniform

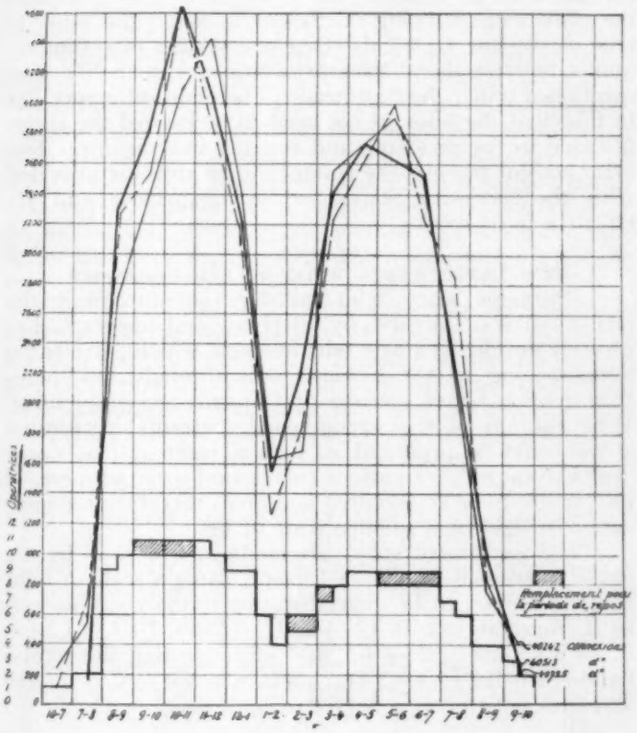


Fig. 1. Curves Showing Traffic in Semi-Automatic Exchange.

distribution of traffic. Thus it was found possible in the Posen exchange, after introducing the 25-part trunk selectors, to save almost a complete set of operators. The limit for the possibility of combination seems to lie at the present time in 20 to 24 sets of keys, which is equivalent to 10 to 12 operators. Whether it is advisable to go beyond this limit is doubtful and would require detail study. The introduction of the 25-part trunk selectors has also reduced the waiting time of the subscribers. These waiting times were registered automatically by a second time clock and a 25-part selector, whose arm was moved on by one step every second. The contracts of the selector were connected with a recording apparatus, as used in manual exchanges. The arrangement was such that the stop watch would set the selector arm in motion as soon as a call reached the I-group selector, with which the registering device was connected. Every second the arm was moved on one step by the clock, until the group selector began to rise, i. e. till the operator had pressed down the last unit or connecting key. At this moment a current impulse passed over the selector arm and excited the recorder connected to the corresponding arm, once. From the readings of the different recorders it was easily seen how many connections had been made by way of the I-group selector and how many seconds had passed from the movement of the first selector arm to the pressing of the last key by the operator. As the time from the removal of the receiver to the setting of the pre-selector to one of the I-group selectors takes only a fraction of a second, the time recorded included all the necessary points desirable. If we wish to obtain the complete time to the going out of the first call to the desired subscriber, we have to add the constant time of 6 seconds, which is taken by the rotation of the mechanical set. More than 1,000 such observations made show that 73.3 per cent of all calls are made within 10 seconds, and that the time from the calling of the operator by a shbscriber to the

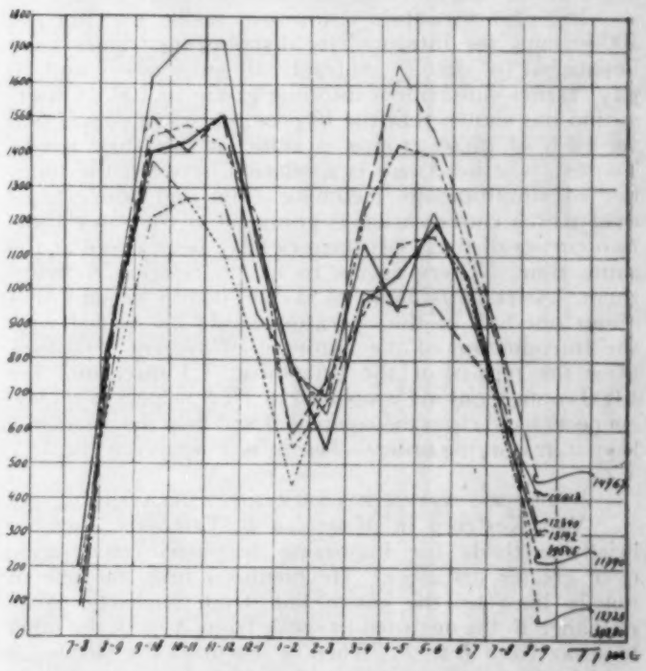


Fig. 2. Curves Showing Difference of Traffic with Various Groups.

time when the first call is sent out to the desired subscriber is, in 73.3 per cent of the cases, not more than 15 seconds. This percentage and time can be improved with growing familiarity of subscribers and operators to the telephone equipment. Quite often the operator has to send a series of call bell impulses to the equipment of the desireh subscriber before the latter answers by removing his receiver. Various observations have also shown that the maximum time taken by the operator to answer a call on the part of a subscriber in periods of maximum traffic is in 50 per cent of all calls within that period 3 seconds and in 74 per cent of all calls 6 seconds.

In the same manner the time was studied during which an operator is actually busy making connections. The "busy" time was taken from the lighting of a call lamp to the pressing down of the unit key. The observations made in more than 5,000 cases are combined in Table 1. This shows that the average time taken for making a connection is 6.21 seconds. The average time

of "busy" periods per operator per hour was taken at 2,854 seconds, which is equal to $\alpha \frac{(2854)}{3600}$ or 0.79. If we assume the average time for connection as 6.21 seconds, then with an efficiency of 450 calls per hour we have an α of 0.77 and for 500 calls of 0.86. The observation of the operators has shown that the demand of 450 calls per hour is not an excessive one and that this capacity can be increased for a short time, say for the period of maximum traffic to 500, without trouble. Greater demands should not be made on the nerves of the operators, nor does it seem possible from the technical side. As the distribution of calls to all the operators guarantees a uniform finishing of calls, it is clear that the two influences that would deal with the efficiency of the system would be, the individual differences of the operators and the uniform or irregular inflow of calls from subscribers. The best efficiency would be obtained, if as many calls came in as are provided for by sets of keys, for 10 operators 20 sets and therefore 20 calls.

In order to obtain a uniform traffic load on the 100-groups, the intermediate distributing frames have been used to join 50 contract call subscribers and 50 pay station subscribers into one group of 100. Observation has shown that the 10 possibilities of connection for each of these groups is sufficient for their needs. To test, whether there is a relation between the number of simultaneous incoming calls and connections over which conversation is going on at the same time, two curves of these two factors have been taken at the same time. There seems to be no relation between them. As regards financial saving, it may be said, that about one-half of the operators could be spared with the introduction of the automanual system. To look after the repairs of the equipment, 1.3 mechanics per 1,000 connections are employed and 1.3 helpers per 1,000 connections to clean the equipment and help the mechanics keep it in working order.—*Telegr. u. Fernsprech. Tech.*

DUPLEX SYSTEM FOR TELEPHONE RELAYING

Van Kesteren in *Maanblad v. Telefonie* discusses briefly methods for improving telephone conversation over greater distances. He mentions first, the use of double lines on the entire line from exchange A to exchange B, the one used to speak from A to B, the other to speak from B to A. Then he discusses the frequently used bridge wiring system with balanced translators. In the third place he mentions the telephone systems where the telephone currents can be strengthened by relays, which are operated either by push buttons at the telephone instruments or else through strengthened telephone currents using oscillating relays. Last of all he mentions the use of current rectifiers.

A new proposal which he makes is shown in Fig. 3 and is said to have given good results in practice.

The system mentioned in the second proposal has the disadvantage that in case there is no symmetry between the lines, the relays and translators are influenced to make vibrations of their own, which produce a singing tone and make conversation impossible. If a sending and a receiving current circuit is short circuited, this singing of the relay will start, but stops as soon as an artificial or natural line is connected between sending and receiving station. This line must have a greater damping coefficient than the strengthened telephone current. Van Kesteren states that in this case the current impulses reaching the receiver are more and more damped, while with direct connection, these current waves have an increasing and ascending tendency. The utilization of this experience, which is true for any closed circuit, even when several relays and lines are connected in series, led to the wiring arrangement shown in Fig. 3, whose method of operation is clear without further discussion. The damping coefficient of L_1 is $\beta=6$; the total increase is $\beta=6$ and the remaining damping coefficient is zero; the same is true of the line L_2. This telephone system therefore requires two telephone lines as would a system like that mentioned under the first head. The main difference lies in this, that the lines do not need to be carried the entire distance to the receiving and sending instruments. The arrangement permits the connection to any line provided with the necessary relays and is inexpensive and yet effective in its work.

NEW EXPERIMENTS WITH TELEPHOTOGRAPHY

Professor Korn, who has done so much with the transmission of pictures by telephone and telegraph, has recently developed a new selenium cell, which permits the strengthening of the currents sent through and therefore gives a better method of transmission of pictures. With the aid of the strengthened currents perforated strips could be produced in such a manner, that every combination of perforations correspond to an element of the picture to be transmitted and gives therefore the indication of light on a suitable scale of light.

The perforated strips are made in five rows by the aid of a Siemens machine telegraph, using a scale of light ranging from 1 to 14, corresponding to the combinations of perforations of: 0, 1, 1+2, 2, 1+2+4, 1+4, 1+3+4, 3, 2+3+5, 2+5, 2+4+5, 4, 4+5, 5, so that the combination of holes 2+4+5 (each a hole in the second, fourth and fifth line) gives a degree of light equal to 11.

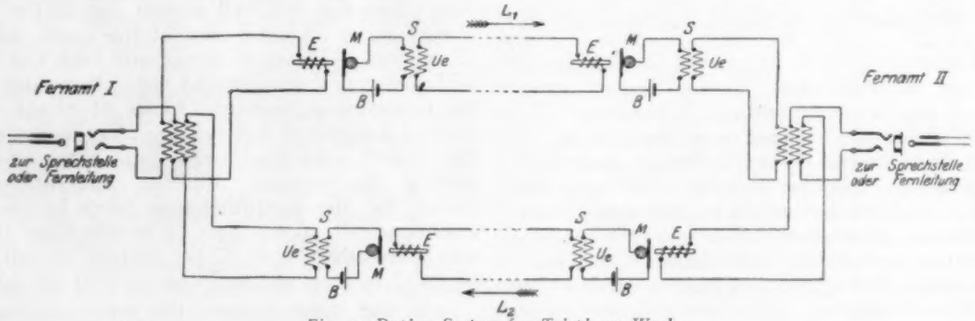


Fig. 3. Duplex System for Telephone Work.

The perforated strip is run through the speed telegraph or the ticker, and letters or signs are written at the receiving station, and the result is directly a letter or sign telegram. A little more complicated is the method of interpreting the telegram from the perforations without the

aid of the machine telegraph. For a portrait a perforated strip with 25,000 combinations of holes is sufficient. Such a portrait can be transmitted within one hour. After the completion of the intermediate print in form of the perforated strip or the letter telegram, the transmission to the receiving station is a matter of ordinary telegraphy. At the receiving station the process is reversed and the telegram is transcribed back into the original picture.

To this end two methods have proved useful; the one consists in having the picture combined on an ordinary typewriter, in that for each telegraphic communication, or each sign, a certain letter on the typewriter is struck. Only instead of the usual type, the typewriter has either a small circle or a square, of such measurements that the area is proportional to the measurement of the standard of light used. The second method again uses a perforated strip in the receiver, which can be made on the typewriter, when the telegram is received.

No. of Connections per Hour.	*Time in Sec. Used for Making of Connections.*	*Average Time for One Connection. Sec.*	*Work Equal to* $\propto \left(\frac{x}{3600}\right)$ *of.*
361	2.431	6.74	0.67
310	2.455	7.91	0.68
404	2.663	6.60	0.74
482	2.630	6.55	0.73
331	2.151	6.50	0.59
354	2.234	6.31	0.62
425	2.505	5.90	0.69
544	2.581	4.76	0.71
469	2.845	6.07	0.79
420	2.455	5.84	0.68
438	2.614	5.96	0.72
490	2.994	6.13	0.83
427	2.777	6.56	0.77
5.375		6.21	0.74

Table 1. Showing Work Done by Operator per Call.

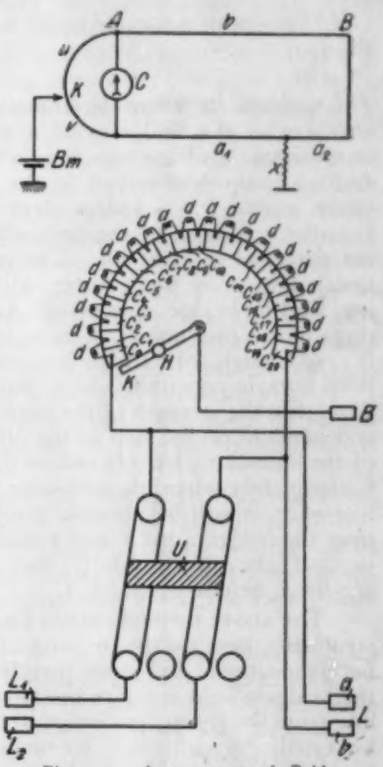
The perforated strip can now be used for automatic reproduction of the picture, by letting the strip run through the transmtiter of a Siemens machine telegraph and takes care that the contacts of this instrument react on a galvanometer connected to a selenium cell receiving apparatus, which shall reproduce the picture in accordance with the perforated strip used in the machine.

Experiments are also under way with the transmission of pictures by submarine cable as also by wireless. Of course it should be noted that the direct method of telephotography without the use of the intermediate cut as just described, is always preferable. Here we need a well insulated line with not too high a capacity, perhaps a telephone line. The intermediate method just described by using the telegraph line of fairly large capacity or a long cable is well for such lines where the longer period of time needed for direct transmission cannot be applied owing to lack of time and extremely busy lines. Every method has therefore its own field.

LIMITING TROUBLE IN TELEPHONE LINES

Many telephone companies use a little book which contains a register of test stations along the telephone line with information as to details of trouble and other information. In smaller exchanges where system is not as much used as in larger ones, this book is usually handed from trouble man to trouble man and gradually becomes next to useless through too much handling. A better plan is to use a card index for each individual telephone line and to record on this all the necessary information. The card used in one exchange has five columns. The first one has the name of the testing or investigation station; the second one gives a descriptive idea of the nature of the test station; the third gives the distance from the nearest telephone exchange; the forth gives the loop resistance in ohms; the fifth the insulation, grounding, or loop, etc.; the last column is for remarks on the last inspection. The notes for columns 1 to 3 are permanent fill-ins; columns 5 and 6 are filled in by the repair men in pencil, so that the remarks in the last column can be erased again, after the trouble has been eliminated. When using such cards, the repair man has an adequate idea of the trouble on the line and can also tell when trouble was found there before and what was the nature of it.

As regards the type of trouble frequently found in telephone lines, we have to deal very often with touching of telephone loops, i. e. touching of the two branches of a double line, with shunts and the touching of telephone lines with other lines; interruption of service through break of telephone wires are rather rare.



Figs. 4-5. Arrangement of Bridge for Localization of Faults.

A very good means to limit the contact of loops is given in finding the loop resistance by direct connection at the different inspection places. These loop resistances are noted on the trouble line card in column 4 and the trouble of determining this resistance is amply repaid by the rapid limitation of the fault in the telephone line. Suppose, the line marked D2788 has, after the long distance exchange is insulated the line, a loop resistance of 180 ohm, then the fault in the line lies between the two exchanges or the two test stations nearest to the 180 ohm reading. The permanent resistances are found on the card devoted to each telephone line, which has the various loop resistances marked, and thus allows an approximate location of the fault in the line by finding the localities nearest to the resistance found by means of the measuring instruments. This method of limiting the location of faults has given good service and has done away with the wearisome method of tesitng the entire line from end to end until the trouble was located.

The arrangement for locating the faults through shunting and contact between lines does not always give such good results, as in such cases the trouble repairman has to deal frequently with variable intermediate resistances. The following method here indicated tries to eliminate the variable intermediate resistance; it is not really a measurement, but merely obtains the relation of the two ends of the line to the faulty place in the line. The method is based on the connection of the Wheatstone bridge when used for ground fault loop tests, as seen in Fig. 4. If there is a shunt at x and for the localization of this fault at the exchange B the double line is connected in form of a loop, shutting out the long distance wires, then u and v in the exchange A represent two arms

of the bridge, just as a_1 represents the third arm of the bridge and $b+a_2$ the fourth arm. In one of the diagonals lies the measuring instrument G, which is used as zero or neutral instrument; the grounded measuring battery Bm as also the shunt x form the other diagonal. If the sliding contact K is moved, until the indicator needle of the measuring instrument G shows zero, then:

$$u.a_1 = v.(b+a_2) \text{ or } \frac{v}{u} = \frac{a_1}{b+a_2}$$

If the fault is located in the b-branch, then: $\frac{u}{v} = \frac{b_1}{a+b_2}$

This process therefore determines the relation of $v:u$ or also $u:v$ of the bridge arms u and v and this is equal to the relation of the two line sections a, and $b+a_2$ or b_1 and $a+b_2$ up to the fault in the line. The relation between $v:u$ or $u:v$ is independent of the intermediate resistance x, as also of the fact, whether there is a different potential in x or not. The smaller the intermediate resistance at x, the greater will be the current flowing in the bridge connection and the easier the setting of the instrument to zero, although the regulation is easy enough with a high resistance. If at point x there is an outside potential, which comes from an outside live wire, then the strength of the current flowing in the bridge is dependent on the sum of the difference of the potential of the measuring battery and on the foreign potential in x. Consequently when the telephone line is in contact with a live wire, it will be possible to obtain a flow of current over the bridge arms u and v and consequently a indication of the needle of G and therefore the relation $a_1:(b+a_2$ or else $b_1:(a+b_2)$.

The above method cannot be used with the usual instruments, because the division of degrees on the scale is not proportional and consequently the resistances used in the bridge would not give the location of the fault on the line from the testing exchange to the middle of the line to be tested. An addition to the measuring instrument has to be used, shown in Fig. 5; the standard measuring instrument is merely used as a zero-instrument and can be replaced by a battery testing instrument, if necessary. The bridge arms (Fig. 5) u and v are made up of 20 equal resistances d, each one equal to an ohm. From each resistance wires lead to two contact plates c, on which glides the movable contact arm K which is moved by a hand crank H. The measuring battery with a voltage of 40 is connected to the terminal B. It is advisable to use a negative voltage, since then in moving the contact arm K the needle of the measuring instrument moves in the same direction with the contact arm. The terminals La/b are in contact with the exterior contact plates c, as also the two cranks of a switch u. With the left position, u with the connections to L_1 and L_2 there is contact with the terminals of the measuring instrument, having the same letters. In the right position, the connections to the standard measuring instrument are insulated, so that it can be used for other measurements. The cranks of the measuring instrument are connected for measurement of insulation without battery i. e. all cranks in the middle position and the plugs in the standard resistance 100, as the galvanometer is not delicate enough at 1000.

Testing: After proper setting of all cranks and after connection of the line to be tested to a special jack of the jack switchboard frame, which is connected with La/b of the special test instrument, shown in Fig. 5, the crank k is moved over the contact plates c, until the needle of the measuring instrument shows zero or almost dero. Take, for example, that the needle shows zero, when the contact arm k is on the contact plate c_{17}, then, since the entire line, measured by the 20 resistances, is divided into twenty sections, the fault lies three tenth of the simple length of the line distant from the testing station in the b-wire; in a 360 km. line about 108 km. away from the testing exchange. The tenths are best recorded on a scale near the contact plate with ink. If the needle moves at contact plate c_{17} to the left, at contact plate c_{18} to the right, then the fault lies in the third tenth of the lengh of the line from the telephone exchange. In the register of testing exchanges or testing stations, the distances are usually not marked, and it would therefore be hard to find out what testing station lies near the 108 km. line. Here the loop resistance found for the loop contacts do good service. If the line D2788 at the loop near Erfurt show 700 ohm resistance, then 3/10 of this is 210 ohms, and the fault is located near a spot having that resistance. Consultation of the column of loop resistances will indicate the nearest exchanges with that resistance and the location is then an easy matter.

If a telephone line is in contact with another live wire, the telephone line in question is grounded at one of the exchanges; which makes the contact a shunt, which can then be limited as described previously. If there is enough time, it is advisable to ground the line in contact at both exchanges, as this reduces the intermediate resistance. The methods described here are not applicable though if there are several shunts or several contacts in a double telephone line. In all other cases, however, they have done good service and have helped reduce the trouble in locating faults in the telephone service.—*Fernsprecht Technik.*

They Know Now, Too Late

The lineman, when half way up the pole, tried to strike one of his spurs into a tin sign. *He couldn't.*

The installer patted a strange bulldog on the head to see if the brute's disposition was affectionate. *It wasn't.*

The counter man tried out the irate subscriber to see if he could fight. *He could.*

The electrician tried the current on himself to see if it was strong. *It was.*

The cable splicer lighted a match to see if there was gas in the manhole. *There was.*

The wire chief asked the operator to marry him, just to see if she was engaged. *She wasn't.*

The operator didn't believe that if she indulged in daydreams while on duty she would have a nightmare. *But she did.*

The foreman thought the rope was strong enough to lift the pole, but he was not sure. *He's in the hospital now.*

The commercial man used hot, cross puns, thinking they were as good as hot, cross buns. *They weren't.*

The trouble shooter tried to cross in front of the auto with his motorcycle. *He couldn't.*

The mail clerk took a chance on that letter going under two cents postage. *It wouldn't.*

The P. B. X. operator thought that big customer wouldn't mind waiting. *He did.*

The stenographer figured that that "struck over" wouldn't be misread. *It was.*

—*Southwestern Telephone News.*

The Sociedad Enterriana de Teléfonos recently purchased a telephone concession operated at Concordia (Entre Rios), Argentina, by Sr. Toncon.

The Commission and the Clayton Law

Interstate Commerce Body Offers Hope to Independents

BY TERRY W. ALLEN

JUST prior to the war in Europe, there seemed to be a concerted effort on the part of big business and the railroads, throughout the country, to cover the country with the idea that federal interference would cause a depression in business. So thoroughly was this campaign waged that Mr. Wilson called attention to the fact that an organized and efficient lobby was at work in Washington for the purpose of causing the Federal Government not to proceed against big business.

Only one department of the government seemed to take this matter seriously, and that was the Department of Justice. That department, which had the power to bring offenders of the anti-trust laws to justice, stopped a number of prosecutions and tried to compromise in dealing with the trusts. No greater mistake was ever made by the Department of Justice than that. You only have to intimate to big business that you are going to be lenient with it and it will take advantage of that leniency and turn into the fields that have before been kept closed and locked against it.

This is exactly the condition that happened in connection with the American Telephone and Telegraph Commpany. The Department of Justice agreed to compromise with the company its suits on the Pacific coast by taking a written agreement that it would be good, and live with competition and not destroy it. This written agreement is known as the Kingsbury Commitment of December 19, 1913.

Independent telephony received this commitment from the government in good faith. I was a member of the Toll Line Commmittee, appointed by the National Independent Telephone Association, after the convention of 1914. We met Mr. Kingsbury in Chicago and the directors of that association approved the Kingsbury Commitment almost unanimously. I say *almost* unanimously advisedly, because I was the only director of the National association that voted against approving the qualified toll line contract.

Had the Federal Government kept on, had the Department of Justice shown any desire to obtain from the American Telephone and Telegraph Company justice, along the lines of competition, a thing which the president and attorney general wrote that this famous commitment would make possible, everything would have gone well; but the Department of Justice put its own interpretation upon the Kingsbury Commitment, and became so lenient with the American Telephone and Telegraph Company that inside of two years, between two and three hundred mergers with Independent properties have taken place in these United States. So many mergers have gone on in the country, so many apparent violations of the Kingsbury Commitment have been evident, that it caused one Independent telephone man to write me as follows:

> We believe in competition as strongly as we ever did; but since there has been so many mergers and so many sub-licensee contracts made, it seems that the real competing companies are now in a hopeless minority and diminishing every day. Since so many of the companies (nearly all) have joined the Bell system, in one way or the other, does it mean that competition is wrong? I believe it is right; and rather than to be driven into joining the Bell System, I would sell out and get out before I would betray the principles I have always upheld and believed in.

And the Department of Justice, that portion of the Federal Government that is supposed to watch over the rights of individuals and to prosecute violations of the anti-trust laws, is the source of this man's lack of faith in the government as a protector of Independent telephony's rights.

Is it possible that the Department of Justice does not realize the attitude it has shown in connection with this commitment? In 1914, before the Tri-State Independent Telephone Association, at Jackson, Tenn., I made the following statement:

"It does seem to me, and I think I want to be as fair with the government as anybody, that the fact that the Department of Justice chooses to ignore the Independent operators is a great mistake, and the government will see that this is a mistake before very long." I have no reasons to believe that the Department of Justice can remain in ignorance of its position, in connection with this commitment.

Had the Department of Justice treated the Independent telephone industry with any kind of consideration, the conditions in telephony generally would not be what they are today. Is it possible that the Department of Justice can sleep on in ignorance and the Democratic administration not suffer?

While the Democratic administration was gaining the confidence of big business by refusing to enforce the anti-trust laws, it lost the confidence of hundreds and thousands of little businesses throughout the country, that are having to contend against the greedy tactics of these offenders against the federal laws.

It did no good to call the attention of the Department of Justice to the gross violations of this commitment, and in desperation, having failed to impress the department in any way, I decided that there must be other portions of the Federal Government that would listen to the appeal of the Independent telephone operators. Naturally, being a public service corporation and a common carrier, I thought of the Interstate Commerce Commission. I wrote the secretary of the commission a number of letters, all of which were replied to promptly, and I was given such information as the secretary had. I was not treated in this manner by the Department of Justice, for any number of my letters to that department remained unanswered, and the department claimed that my letters to it were in a measure offensive.

Finding that the Interstate Commerce Commission was more appreciative than the Department of Justice, I took pains to write it in connection with this famous commitment, of which it is a part. In the Kingsbury letter of commitment, the second paragraph reads as follows:

> The question as to the course to be pursued in such cases will be submitted to your department and to the Interstate Commerce Commission for such advice and directions, if any, as either may think proper to give.

In other words, in that paragraph, the Department of Justice and the Interstate Commerce Commission were placed upon an equal footing, and I wrote to the

commission asking if any of the mergers that had been consummated throughout the United States had been submitted to it, as it was just as much a part of this commitment as was the Department of Justice. In reply to this letter of mine, the Interstate Commerce Commission came back in an answer from Chairman B. H. Meyer.

I want to give part of Mr. Meyer's letter, because I think it shows that the Interstate Commerce Commission felt that it had been purposely ignored and because it is really in a position to do more for Independent telephony than any other department of the Federal Government.

At the time of that agreement, this commission had no anti-trust jurisdiction. Since then, its jurisdiction has been broadened by the passage of the Clayton Anti-Trust Act, on October 15, 1914.

The commission desires to direct your attention to the Clayton Act, particularly to sections 7 and 11 thereof, and to suggest with reference to your recent communications, and your previous communications to the secretary anent telephone mergers, that you furnish to the commission such evidence as in your opinion shows that there is good reason for believing that section 7 of the Clayton Act is being or has been violated. Upon the production of such evidence, the commission may be able to determine whether or not under section 7 of that act, a complaint shall issue.

You will note that in this letter Mr. Meyer calls attention to the fact that the Interstate Commerce Commission had no jurisdiction prior to the passage of the Clayton Anti-Trust Law. In fact the Clayton Anti-Trust Act appears to be a law that is very little read or understood. Mr. Meyer's reference to section 7 of the Clayton Anti-Trust Law should be especially noted by all Independent telephone men; for under section 7, the first two paragraphs, lies the hope of Independent telephony. I give these two paragraphs from this law as follows:

That no corporation engaged in commerce shall acquire, directly or indirectly, the whole or any part of the stock or other share capital of another corporation engaged also in commerce, where the effect of such acquisition may be to substantially lessen competition between the corporation whose stock is so acquired, and the corporation making the acquisition, or to restrain such commerce in any section or community, or tend to create a monopoly of any line of commerce.

No corporation shall acquire, directly or indirectly, the whole or any part of the stock or other share capital of two or more corporations engaged in commerce where the effect of such acquisition, or the use of such stock by voting or granting of proxies otherwise, may be to substantially lessen competition between such corporations, or any of them, whose stock or other share capital is so acquired or to restrain such commerce in any section or community, or tend to create a monopoly of any line of commerce.

This shows to the mind of an average thinking individual that the mergers that have been carried on in the United States are all illegal, and the Interstate Commerce Commission has a right so to declare them; not only whether they were contemplated prior to December 19, 1913, or not, but if they were consummated since the jurisdiction of the Interstate Commerce Commission was extended by the Clayton Anti-Trust Act, they can be annulled through this law. In other words, the Interstate Commerce Commission stands ready, according to Mr. Meyer, to help Independent telephony, if Independent telephony will appeal to the Interstate Commerce Commission.

The great question to my mind is the rights of competition. Is competition right or wrong? Certainly, no thinking student of economics would state that monopoly was preferable to competition. The only question about competition is, can competition be carried on honestly and equitably under the regulation of the Federal Government, or have we got to resort to government ownership to get justice?

The only safe method to prevent government ownership of telephone and telegraph lines is to foster and not destroy competition. Honest competition is right, whether it is in the telephone business, the mercantile business, the railroad business, between towns, between states or between any portion of our democracy. Competition builds, monopoly destroys. Competition gives honest service, monopoly gives what you can get. Competition gives the consumer the benefit of fair prices, monopoly gives nothing. Competition brings out efficiency, monopoly curbs efficiency. Competition brings development in apparatus, in telephone equipment, in all lines of the telephone industry and in the operating fields where competition exists, while monopoly throttles development, curbs extension and tears down the very fabric of Americanism that all men are created free and equal.

Let us have competition upon an equitable basis. Let us quit this idea of combining with monopoly. Let us fight our battles under the regulation and guidance of the Interstate Commerce Commission, and let us appeal to it honestly, justly and fairly and let it decide our case. In it lies our hope and let us not neglect this opportunity.

Pacific Employes Form Rifle Club

Fifty employes of the Pacific Telephone and Telegraph Company at Sacramento, Cal., met in the local telephone building and organized the Sacramento Telephone Rifle Club, as another move in the interests of preparedness. The charter members will campaign to have every male employe of the telephone company in the city affiliate with the organization.

Permanent organization was effected and the following officers elected: President, C. L. Maritzen; vice-president, E. A. Mayers; secretary, J. R. Farrington; treasurer, F. J. Ware; executive officer, R. E. Walker; team captain, W. M. Jones.

The telephone company is encouraging its employes to join the new organization and is offering all possible co-operation in getting the rifle club started.

It is the intention of the new organization to apply for membership in the National Rifle Association, a body that includes hundreds of rifle clubs and such organizations.

The new club will receive assistance from the government. One Krag-Jorgenson rifle will be given for each five members. Later all who qualify as sharpshooters and experts will be given the rifles free of charge. The government will also furnish 120 rounds of ammunition per year to each man. The new club will endeavor to get permission to use the North Sacramento range.

The charter members of the club follow: J. P. Noble, H. E. McKee, J. F. Lowrie, C. L. Maritzen, J. R. Farrington, F. J. Ware, R. E. Walker, W. M. Jones, R. Montgomery, J. R. Reeves, M. A. Page, F. Branch, A. McCambridge, W. B. Thomas, W. P. Pridgeon, L. M. Brown, A. W. Katzenstein, J. Quayle, T. Duhain, P. Duhain, W. Avis, M. A. Irwin, J. W. Miller, Ed Prevost; C. L. Shipley, W. Henshaw, J. J. Flaherty, L. H. Cochran, C. McCormick, A. McCormick, R. Parkinson, H. Myers, J. Liddicoat, P. Gordon, W. Ashley, H. Best, C. Burrows, C. Tappan, A. Schlaegel, L. Powell, B. Rellyn, R. Younger, Lester Noonan, E. Stevens, D. Cady, A. E. Larson and R. Ford.

"Pupinized" Telephone Lines

A Description in Popular Language of the Great Long Distance Invention, from the Scientific American

BY FRANCIS B. CROCKER

ALTHOUGH the invention of the "Pupinized" telephone line was made fifteen years ago, and is often mentioned in papers relating to electrical matters, it has rarely, if ever, been described, except in very technical terms, although it is a matter of great general interest, as by this invention a problem of great practical importance is solved in an entirely scientific manner; in fact, it is a noteworthy example of obtaining great practical results from purely *a priori* reasoning. The problem was conceived, and largely worked out, by theoretical calculations before any experiments were made, even in the laboratory. In spite of its great importance and peculiar interest, the principles upon which this invention is founded and its real nature are often misunderstood, even by those otherwise well infromed in electrical matters, and consequently the following description is presented in as popular language as the subject permits.

This invention was publicly described to the American Institute of Electrical Engineers by Professor Pupin in May, 1900, but was conceived and developed by him some time earlier. The principal object of the invention is to conserve the amplitude and form of the electrical waves corresponding to human spech when they are transmitted to considerable distances by conductors, especially underground and submarine cables. In this way the distance at which intelligible telephone conversation may be carried on is increased. The Pupin invention of "loaded lines" is often supposed to depend upon the neutralization of their electrostatic capacity by introducing inductance coils along such lines. This principle does apply to his pioneer work in electrical resonance, and in tuning circuits to make them responsive to a particular frequency of alternating current. But it does not, however, apply to "loaded" or "Pupinized" conductors. Indeed, the condition of resonance is avoided in the latter case, and a relatively large amount of inductance may be advantageous, especially for long lines, provided excessive resistance, hysteresis and eddy current losses are not introduced at the same time.

The simplest analogy to Pupin's invention is the fact that a projectile must have considerable mass in order to overcome the mechanical resistance of the air and travel a long distance. Similarly, a conductor must have electromagnetic mass, or inductance, in order that an electric impulse or wave may overcome the electrical resistance and travel a long distance. It is necessary in the case of the conductor to *distribute* the inductance along the path of the electric impulse or wave, hence the phenomenon is more closely analogous to that of a long cord stretched between supports, which must have distributed mass, that is to say, it must be a fairly heavy cord in order that mechanical vibration or waves may be propagated to a considerable distance along it. In the case of the electrical conductor, for example, a telephone line, it is not convenient to distribute the electromagnetic mass or inductance *uniformly*, so that it is introduced in the form of inductance coils placed at certain intervals throughout its length. This corresponds to the mechanical fact that a light cord with distributed weights attached to it is practically equivalent to a heavy cord. Pupin determined by calculation and by experiment that the distance between the coils, like the distance between the weights, must not exceed a prescribed amount in each particular case. That is to say, there must be at least a certain number of coils per wave length in order to approximate a uniformly *distributed* inductance, otherwise they may do more harm than good. Moreover, the shortest wave length must be considered. In telephony the highest frequency necessary to transmit articulate speech is about 1200 waves per second. This corresponds to the upper harmonics or overtones in some of the consonant sounds. Hence the wave length at this frequency is calculated for the given conductor, together with the loading coils, which have a certain total resistance, capacity and inductance that is assumed to be uniformly distributed. As demonstrated by Pupin, in a conductor having not less than eight or ten of his coils per wave length, this assumption is approximately correct. To arrive at these facts Pupin devised new mathematical methods, and solved the various problems in a most thorough and exact manner. He also made experimental tests upon artificial as well as actual telephone lines and underground cables which fully confirmed his theoretical investigations.

Pupin further showed how to design the coils for loading lines in order to obtain maximum inductance with minimum resistance, hysteresis and eddy current losses. In fact the practical success of his system requires that these losses be reduced to a minimum, and this was accomplished by ingenious and careful construction.

The Pupin "loaded line" permits higher voltage to be applied to it, whereby the electrical waves may be transmitted to a correspondingly greater distance. In the transmission of electric power it is sufficient to use 110 or 220 volts to supply motors locally. For long distances electrical pressures are raised to 100,000 volts, or even higher. In an analogous manner higher voltages applied to "Pupinized" lines increase the distance at which telephonic communication may be practically carried on. If the voltage were raised on an ordinary unloaded line the current would be proportionally increased and the losses would rise in even greater proportion. The losses would also be aggravated if resistance were introduced to limit the current. On the other hand, the introduction of inductance coils adds to the reactance of the line so that the current is not excessive even with a higher voltage. This reactance simply stores the energy momentarily and returns it, but does not itself increase the losses. There is a certain amount of loss in the resistance and iron cores of the coils, but this is relatively small compared with their reactance.

The industrial application of "Pupinized" lines has been remarkably successful and important. In the United States the American Telegraph and Telephone Company purchased Pupin's inventions in this field, and has "loaded" many thousands of miles of over-

head and underground telephone cables with Pupin coils. In many cases the cost of the large conductors, as well as their excessive weight and bulk, would be practically prohibitive if it were not for the saving in the size of wire that is secured by Pupin's invention. This applies particularly to the very important telephone lines that have been laid underground between Washington, Philadelphia, New York and Boston in order to avoid the danger of interruption of overhead service by severe wind or sleet storms. There is a practical limit to the distance to which speech can be successfully transmitted by underground or submarine cables. For distances of fifty miles or more copper conductors of such large size would be required that their cost would be so high, and they would require so much expensive insulation to cover them, that the investment would become excessive. Moreover, the very object of using large conductors is to reduce their resistance and thereby make up for the relatively high electrostatic capacity of underground or submarine cables. At the same time these large conductors would have correspondingly greater electrostatic capacity, which calls for still lower resistance, and so on. In short, the remedy itself increases the trouble so that still more remedy is needed, which further adds to the difficulty, and the situation appears to be hopeless. Fortunately, the "Pupinized" underground or submarine cable may have conductors of moderate size, because their resistance does not have to be reduced to an extremely low value to make up for the high electrostatic capacity. The latter is practically inevitable when conductors are laid under ground or under water, due to the condenser effect between the conductor and the earth or water, as well as the sheathing usually applied to such cables. In accordance with the Pupin invention the electrostatic capacity is not neutralized but overwhelmed by introducing large inductance. Hence the above-described conflict of conditions is avoided.

Lehigh Valley Operators Shift Quarters

Imagine a large force of telephone and telegraph operators suddenly laying down their receivers and abandoning their keys, donning their hats and wraps and quitting their quarters. Picture the offices they leave as being located at the terminal of an important railroad. Sounds serious, doesn't it? One would almost expect the railroad to cease operation—for a while anyhow. But it did not—not even for a moment. The force was that of the Lehigh Valley Railroad at Buffalo. The quarters they left were in the old passenger station which has done duty for the railroad since the line entered Buffalo. When they left it they proceeded directly across the street to offices in the handsome new passenger station now practically complete. When they got there everything was in readiness for them. There were new switchboards and a great deal of other equipment of the most modern variety, but the operators had no difficulty in finding themselves. The wires were working just as they had left them and not a railroad wheel had ceased turning while they journeyed from the old to the new station.

The wire arrangements in the new station are pronounced ideal. A feature of special interest to Buffalo is the fact that none of the wires go overhead until well outside of the city. They are carried in conduits under the street and the new train sheds, avoiding the unsightly open wire telegraph pole lines in the vicinity of the terminal.

Recreation Camp for Chicago Operators

The new recreation camp for telephone women, which the Chicago Telephone Company is establishing on the banks of the DuPage river, near Warrenville, Illinois, with attractive buildings and beautiful grounds, will bear the name "Margaret Mackin Hall." To this name attaches an interesting story.

When the telephone business was begun in Chicago, nearly forty years ago, but few women and girls were employed in the business district. That part of the city was held sacred to the men whose supposedly greater mental and physical attainments better fitted them for the problems there to be met and solved. In those days women workers were so rare that their presence caused them to be noticed and sometimes commented upon.

The telephone company at the outset employed boys and young men as operators, but soon realized—when the work of handling the appliances became less strenuous—that the services of women would be more satisfactory. Women were more patient, courteous and painstaking and appreciated steady employment. So gradually the gentle-voiced maidens edged the last of the boys out of the exchange door and took full possession, which they have successfully maintained for years.

In 1883 Margaret Mackin, very young, full of health, energy and interest, became an operator in one of the busiest down town offices. Margaret liked the work, liked her associates and all the subscribers whose calls she answered. It didn't matter if the hours were long and the work exacting, that people were occasionally cross; Margaret radiated good nature and helpfulness. She did her work, did it well, and then reached to the right and left to help those beside her. She was thoughtful, observant, resourceful, and soon it was Margaret to whom the manager went for information and suggestion about the traffic. It was Margaret who was asked about new devices it was proposed to try. She was promoted from one position to another, year by year, until, when she had been with the company twenty-one years, she resigned and was married to Albert P. Hyatt, of the company's staff of engineers.

But her respite from the telephone service was short. In a time of stress, the company induced Mrs. Hyatt to return to the work and for several years, up to January 1, 1915, she occupied one of the most responsible and highly compensated positions in the telephone service in the world, and upon her retirement her associates honored her with the title, "The World's Greatest Telephone Operator."

The recreation camp is being provided by the company at a very large outlay, for the pleasure and benefit of the operators. It is for the operators solely. It is named "Margaret Mackin Hall" in recognition of a successful, a splendid record made by a sister of the craft. Margaret Mackin in her long service and in the character of that service to the public, is the best expression of the spirit of the operator, and in honoring her, the telephone company feels that it is honoring itself.

The Grand Rapids *Press* is guilty of the assertion that the devil's telephone number is

773H

and that the proper way to read it is to turn it upside down—*Transmitter.*

Telephone Patents Issued Recently

A Brief Digest of those Current Specifications Most Interesting to Telephone Men

BY DAVID S. HULFISH

NO. 1,177,768. Relay. Issued to John Erickson, assignor to Automatic Electric Company, Chicago, Ill. In a single relay, some of the contact springs return more quickly than others, a mechanical delay being applied to some of the springs.

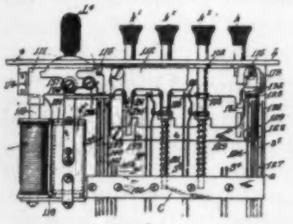
1,177,789. Automatic Switch Circuit. Issued to T. G. Martin, assignor to First Trust & Savings Bank, trustee, Chicago, Ill. (Application filed July 23, 1906.) At the final connection, two relays control the switch and supply current to the calling telephone, a relay upon the called side of the condensers also being controlled in part from the calling line.

1,178,021. Hook Lever. Issued to R. H. Manson, assignor to Garford Manufacturing Company, Elyria, Ohio. By pushing upon the end of the hook it retires into the cabinet for convenience in shipment.

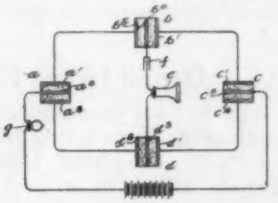
1,178,023. Key. Issued to G. E. Mueller, assignor to Kellogg Switchboard and Supply Company, Chicago, Ill. (Application filed March 1, 1907.) A listening key is combined with a row of party-line selecting buttons, each of which operates a slide to control common springs. An electromagnet controls a common slide to unlock any key which may be locked down in ringing position.

1,178,207. Tag Bank. Issued to C. F. Baldwin, assignor to Western Electric Company, New York, N. Y. A bank of tags for an automatic switch is assembled by coating paper with insulation, arranging layers of tags between strips of paper, and compressing the bank until the paper is less than its original thickness.

1,178,472. Telephone Set. Issued to A. B. Smith, assignor to J. B. Russell, New York, N. Y. Four transmitters of three



1,178,023



1,178,472

electrodes each are arranged in the line circuit and the receiver is connected at equi-potential points.

1,178,878. Speech Relay. Issued to Josef Schiessler, Baden near Vienna, Austria. The receiver actuates a lever which presses upon a microphone diaphragm. Means is provided to damp the vibrations of the lever.

1,179,175. Telephone System. Issued to E. A. Graham, Brockley, London, England. In addition to two wires for speech transmission, a third wire issued for current to transmitters, as well as a common wire or earth return.

1,179,741. Automatic System. Issued to G. E. Mueller, assignor to Kellogg Switchboard and Supply Company, Chicago, Ill. (Application filed April 13, 1907.) The searching movement to pass a busy trunk is caused by the electrical condition of the tag tested. An auxiliary register is used for adjusting searching brushes selectively.

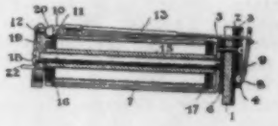
1,180,286. Trunk. Issued to E. D. Fales, assignor to Automatic Electric Company, Chicago, Ill. (Application filed December 1, 1908.) A trunk between two automatic offices may be used in either direction and is made busy at both ends as soon as it is seized at either end, and is restored at both ends as soon as released.

1,180,293. Station Selector. Issued to J. A. Hulit, assignor to Automatic Electric Company, Chicago, Ill. A step-by-step station selector for party lines, but not responsive to a call-sender of an automatic telephone system.

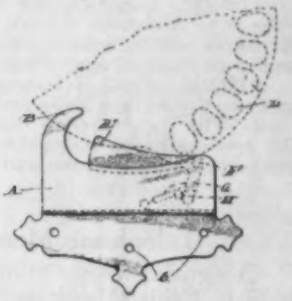
1,180,397. Wire Clamp. Issued to D. C. Hooker, assignor to the Johns-Pratt Company, Hartford, Conn. By turning the smaller part of the clamp a large wire can be clamped, yet maintain the jaws parallel.

1,180,510. Relay. Issued to C. D. Lanning, Dorchester, Mass. (Application filed December 26, 1905.) The winding is hollow and magnetic parts in contact with each other inside assignor to First Trust and Savings Bank, trustee, Chicago, Ill. the winding carry the local circuit and vary the resistance of the local circuit as the current through the winding varies.

1,180,692. Drop. Issued to C. C. Bradbury, assignor to Kellogg Switchboard Supply Company, Chicago, Ill. (Application filed February 25, 1908.) The armature is an open ring



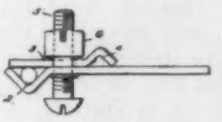
1,181,679



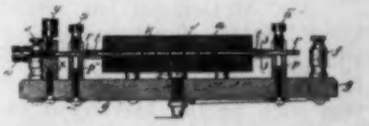
1,180,692

and is attracted by the drop shell rather than by the magnet cord.

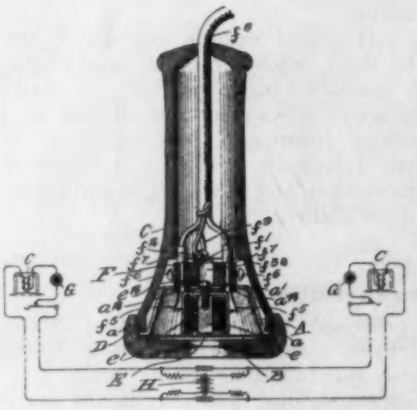
1,180,843. Automatic Switch. Issued to C. L. Goodrum, assignor to Western Electric Company, New York, N. Y. Long steps cause the wipers to reach a selected group and short steps then select a contact of the group, the same magnet driving both short and long steps.



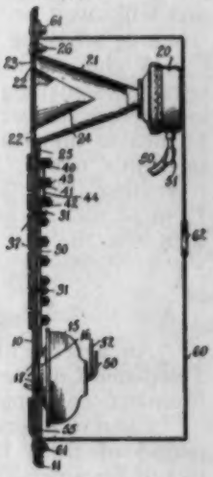
1,180,397



1,180,510



1,181,710



1,181947

1,180,917. Thermotelephone. Issued to Otto Graetzer, Berlin-Lichterfelde, Germany. From a center point, many Wallaston wires radiate and their outer points are clamped by a collector band.

1,181,092. Automatic System. Issued to W. L. Campbell, assignor to First Trust & Savings Bank, trustee, Chicago, Ill. (Application filed June 10, 1907.) A rotary final connector selects an idle line when several lines extend to the same destination. The called telephone controls the supply of current to the calling line.

1,181,093. Automatic Party Line. Issued to John Erickson,

(Application filed September 15, 1906.) The calling earth of the Strowger call-sender is normally open, and the first telephone lifted upon a party line may close its earth, but not the other telephones.

1,181,559. Automatic Intercommunicating System. Issued to F. W. Adsit, assignor to Adsit General Electric Company, Minneapolis, Minn. Each telephone line has a connective switch of one movement of selection at the central office, and circuit arrangements permit ringing by a button at the calling station.

1,181,679. Attachment. Issued to E. A. Mellinger, assignor to Automatic Electric Company, Chicago, Ill. In a Strowger call-sender, a latch rises behind the finger tip and obliges the removal of the finger from the dial before the dial begins to return.

1,181,710. Direct-Current Receiver. Issued to B. D. Willis, assignor to Automatic Electric Company, Chicago, Ill. The coefficient of self-induction of the receiver magnet divided by the number of turns of wire is one in eight thousand.

1,181,947. Flush Telephone. Issued to J. O. Cadieux, assignor to Connecticut Telephone and Electric Company, Meriden, Conn. The transmitter is flush with the face of a wall box. The receiver has a megaphone and a central conical deflector flush with the face of the wall box.

Telephone Men for Signal Corps

A signal corps in Ottumwa, Iowa, is being considered by E. E. England, manager of the Iowa Telephone Company, and F. A. McDermott, chief tester. The latter was instrumental in organizing a body of forty-two men into a signal company at Davenport during the latter part of January, which has been successful thus far. The corps is organized into a club at present and has a building and grounds of its own, in addition to the equipment consisting of a wireless outfit, telegraph keys, flags and other paraphernalia.

Mr. McDermott has served in Company A of the United States signal corps, and has seen service in the Philippines. He is greatly interested in seeing this country well prepared for war, and believes that an organization such as the Davenport one, which is entirely independent of the state or national government, will do much toward insuring better service in times of war. He and Mr. England have the matter under advisement, and will await an expression from the public before attempting anything definite.

A club of this sort would include practice in telegraphy, signalling by flags, smoke, rockets, searchlights and heliograph with possibly target practice. It would fit men to undertake active service in time of war at a moment's notice, besides forming a pleasing mode of recreation. The Iowa Telephone Company is highly in favor of such an organization, and is willing to co-operate with it to the best of its ability.

Wages in Butte, Montana

An agreement proposed by the Mountain States Telephone Company to its operating employees at Butte, Montana, contemplates the following salary scale:

Local:—Apprentice operator, $40 per month for a period of three months; apprentice operator, $45 per month for a period of three months; junior operator, $50 per month for a period of six months; junior operator, $52.50 per month for a period of six months; operator, $55 per month for a period of six months; operator, $57.50 per month for a period of six months; operator, $60 per month for a period of 12 months; operator, $62.50 per month for a period of 12 months; operator, $65 per month thereafter.

Toll:—Apprentice operator, $42.50 per month for a period of three months; apprentice operator, $47.50 per month for a period of three months; junior operator, $52.50 per month for a period of six months; junior operator, $55 per month for a period of six months; operator, $57.50 per month for a period of six months; operator, $60 per month for a period of six months; operator, $62.50 per month for a period of 12 months; operator, $65 per month for a period of 12 months; operator, $67.50 per month for a period of 12 months; operator, $70 per month thereafter.

Supervisor, $65 per month for a period of 12 months; supervisor, $67.50 per month for a period of 12 months; supervisor, $70 per month for a period of 12 months; supervisor, $72.50 per month for a period of 12 months; supervisor, $75 per month thereafter.

Low Wires Illegal, Says Court

The Fort Dodge, Iowa, Telephone Company management considers itself fortunate, that twenty-five foot poles were placed on all its rural lines. Many of the companies throughout the state, use poles only eight or ten feet high and these will have to be replaced, according to a ruling of the supreme court. The decision was rendered after a damage suit at Sac City, where a farmer had been knocked off a load of hay by low wires. If this decision is upheld, it will mean a cost of about $2,000,000 to the telephone companies in the state, as there are several hundred thousand poles that only reach six or eight feet off the ground. The telephone companies in their petition to the court to reconsider their decision, point out the cost of making the change and that this cost would have to be paid by the patrons of the line in the way of increased charges.

Detroit Home Rule Petition Denied

A writ of prohibition restraining the state railroad commission from acting on the application of the Michigan State Telephone Company for increased rates in Detroit, asked in a petition prepared by Corporation Counsel Dingeman for the supreme court, has been denied by that tribunal.

The petition set forth that the city is empowered by the constitution to regulate the use of its streets and public places by public utility corporations.

The telephone company claims that it will need $700,000 more a year from Detroiters to make its return on its investment a reasonable one.

The only recourse the city now has is to take the case through the chancery courts. This Mr. Dingeman and Otto Kirchner, who has been associated with him in the case, say involves bringing into the court every angle of the case and will cost thousands of dollars to the city and to the company.

New England Independent Absorbed

New England Telephone & Telegraph Company is about to absorb one of the few remaining Independent telephone companies in Massachusetts. Negotiations are in progress between representatives of the Bolton Telephone Company, owner of the exchange in Bolton, and the big company. Edward D. Emerson, president of the local company, states his company has made known the conditions upon which it will sell, and the New England company has set forth the conditions upon which it will buy, and that the parties are not far apart. He predicts that the deal will go through. The Bolton company has about 100 subscribers. The greater part of the exchange has been installed for about 15 years. The value of the plant is said to approximate $10,000.

MINNESOTA TELEPHONE NEWS

BY THE MINNESOTA INDEPENDENT TELEPHONE ASSOCIATION
326 McKnight Bldg., Minneapolis, Minn.

AN ORDER IN THE MATTER OF COMPLAINT BY STOCKHOLDERS OF THE WEST CONCORD FARMERS TELEPHONE COMPANY FOR A DIVIDEND, AND THE MUTUAL TELEPHONE COMPANY OF WEST CONCORD, OF DISCRIMINATORY PRACTICES.

FOR convenience these two cases have been consolidated.

Certain stockholders of the West Concord Farmers' Telephone Company alleged that it was engaged in discriminating in the rental charged subscribers for telephone service and that the company retained a large surplus from its earnings, which should be given back to the stockholders in the form of a dividend. The complaint requested the commission to make a full investigation of the affairs and condition of the company and compell the payment of a fair dividend to the stockholders.

The complaint filed by the Mutual Telephone Company of West Concord briefly stated, is that it operates a toll line from West Concord to Pine Island, a distance of approximately 14 miles; that it owns seven miles of this line, and the Pine Island Telephone Company owns the remainder; that its subscribers are required to pay ten cents for each outgoing message from West Concord to Pine Island and a similar charge is made by the Pine Island Telephone Company for messages going in the opposite direction; that the West Concord Company likewise operated a toll line from West Concord to Pine Island and that it uses about seven miles of the same pole line of the Pine Island Telephone Company that is used by the Mutual Company; that the Pine Island Company charges a toll rate of ten cents on outgoing business from Pine Island to West Concord and that no charge is made by the West Concord Company on outgoing toll business from its exchange to Pine Island; the two companies operate parallel rural and toll lines throughout a territory embracing about 135 square miles and are competitors for business; the practice of the West Concord Company is claimed to be a discrimination and the commission is asked to make an order compelling that company to make a toll charge of ten cents per message on out-business in Pine Island and thereby place the two companies on a parity for the same class of service.

The West Concord Company is a corporation with a capital stock of $14,900. It was organized in March, 1909, and operates a local telephone exchange in the village of West Concord and rural lines in that vicinity with a total number of 321 subscribers. The construction is of open wire with a majority of the circuits grounded. It has approximately 122 miles of farm pole lines and a preliminary report of the company filed with the commission indicates the value of the local and rural lines and equipment to be $15,000, with $1,000 in land and buildings, making a total of $16,000. The telephone supervisor and statistician of the commission made a careful examination of the plant and accounts of the company and their reports have been filed with the commission, and have been a part of the record of this case.

A general inspection of the outside plant, the commission says, indicates a very low class of maintenance and that the construction and repair work has, until recently, been done by unskilled labor. The plant has been allowed to deteriorate to such an extent that good service cannot be rendered and a large expenditure will be requird to place it in first-class condition. This company paid a six per cent dividend in 1911 and 1912, fifteen per cent in 1913, and none in 1914. Early in the year 1914 a number of the stockholders of the West Concord Company being dissatisfied with the management, promoted and succeeded in forming the Mutual Telephone Company of West Concord. This company operates a local exchange in West Concord, with rural lines into the same territory as that covered by the West Concord Company. The exchange is of entirely aerial cable construction, there being approximately 120 miles of rural pole lines. All exchange and farm circuits are full metallic. All construction is of the latest type and is first-class in every particular. The commission says the plant is of sufficient capacity to take care of all the business for a number of years in the territory covered. On July 1 this company was serving 116 subscribers in West Concord and 262 farm subscribers, or a total of 378. Since the new company began operations the business of the West Concord Company has constantly diminished. The report shows that on April 30, 1913, the West Concord Company had 499 telephones with a monthly rental of $497.50 and that on July 31, 1915, the number of telephones was reduced to 295, with a monthly rental of $221.50. For the twelve months ending March 31, 1914, the rentals and tolls amounted to $6,357.35. For the eleven months ending February 28, 1915, $5,502.62 and for the four months ending June 30, 1915, $992.77. The salaries of the company remained practically the same. For the year ending March 31, 1914, the excess of the receipts over disbursements was $4,654.34. For eleven months ending February 28, 1915, the disbursements exceeded the receipts by $1,442.10 and for four months ending June 30, 1915, $990.69, or $247.67 per month for that period. The cash on hand March 1, 1915, was $4,434.90. No depreciation has been charged by the company at any time. The cash on hand will not begin to pay the cost of the improvements that would have to be made to put the plant in good operating condition. The year that the fifteen per cent dividend was declared by the directors the disbursements actually exceeded the receipts from operation of the plant.

A careful investigation of the reports does not show any free rental service given to subscribers.

In regard to the declaration of dividends it is provided in Section 6133 G. S. 1913, that in all stock corporations the directors shall "declare such dividends of the profits of the business as they deem advisable, but shall not thereby reduce the capital while there are outstanding liabilities." The general rule, as stated in Thompson on Corporations (2nd Ed.) Section 3294, is as follows: "The fact of making a dividend and the amount thereof is within the discretion of the directors and the courts will not interfere except on proof of bad faith or a clear abuse of such discretion." The commission is not expressly authorized to compel a telephone company to declare a dividend and in the absence of such authority it cannot do so. The request for such an order was therefore denied.

The complaint of the Mutual Telephone Company, the commission says, can be disposed of in a few words.

It shows that the West Concord Company, a competitor, is giving its subscribers free service on toll messages from West Concord to Pine Island, while the Pine Island Company is charging its subscribers ten cents per message from Pine Island to West Concord. The toll service between the two points is over a line jointly owned. The commission has heretofore ruled that the same rate must be charged for toll messages in both directions. Under the circumstances it is fair that the West Concord Company is required to assess a toll charge on conversations from West Concord to Pine Island of ten cents per message, this being the sum charged by the Pine Island Company on incoming messages, and they must file a tariff with the commission accordingly.

The map filed in the case shows that both telephone companies are incorporated within the same village, the stock is held largely by the same individuals, and the lines parallel each other in all directions throughout the territory served. No more striking illustration can be presented, says the commission, to show the disastrous effect of unnecessary duplication, as the telephone company could have given all the telephone service which the community demands, and if the original plant had been efficiently maintained and operated, there would have been no need of a duplication and eventually the duplication will cause the stockholders in that community a serious financial loss.

APPLICATION OF THE STAR TELEPHONE COMPANY OF FARMINGTON, TO INCREASE ITS LOCAL EXCHANGE RATES AT FARMINGTON, LAKEVILLE, ROSEMOUNT, MENDOTA, PRIOR LAKE, NEW MARKET, WEBSTER, LONSDALE AND NORTHFIELD.

Application has been filed by the Star Telephone Company in which it alleges that the present earnings do not provide a sufficient revenue to enable it to give good service to set aside a reserve for depreciation or permit of a reasonable return on the investment, and it is therefore necessary to increase the local exchange rates at all of its exchanges as follows:

PRESENT RATES

1-party business telephone	$ 1.50 per month
2-party business telephone	1.00 per month
1-party residence phone	1.50 per month
4-party residence telephone	1.00 per month
1-party rural telephone	2.00 per month
Multi-party rural telephone	15.00 per year

Rural subscribers are allowed a discount of $3 per year for payment in advance.

PROPOSED RATES

1-party business telephone	$ 2.25 per month
2-party business telephone	1.75 per month
1-party residence telephone	2.00 per month
4-party residence telephone	1.50 per month
1-party rural telephone	2.25 per month
Multi-party rural telephone	1.50 per month

A discount of 25 cents per month to be allowed on local business and residence telephones if paid at the company's office on or before the last day of the month in which the service is rendered. Rural subscribers to pay quarterly in advance and be allowed a discount of 25 cents per month if payment is made on or before the last day of the first month of the quarter.

Permission is also asked to put into effect the following regulations: That at the end of three months, for non-payment of rent, the subscriber's service is to be discontinued.

The commission arranged to have a hearing in the City Hall at Farmington on the 30th of June at 10:00 o'clock, at which all interested parties could appear and give evidence for or against the granting of the application. Notice of hearing was served upon the officers of the Star Telephone Company and the presidents of each of the above named villages and also by publication in one issue each of the Farmington *Tribune* and the Northfield *News*.

THE COMMISSION IS ABOUT TO MAKE AN INVESTIGATION OF LONG DISTANCE TELEPHONE RATES.

At a meeting of the executive committee of the Minnesota Independent Telephone Association last March, the following resolution was unanimously adopted:

That this committee is not certain that the raise or adjustment of toll rates by both larger toll line companies and many of the smaller ones just prior to July 1, 1915, is entirely justified by conditions.

That it is a question which cannot be determined without a full and careful investigation by the Railroad and Warehouse Commission; we earnestly urge that action be taken to bring such an investigation before it at such a time as the funds at the disposal of the commission will be sufficient to conduct such an investigation to the best advantage to the public.

That this committee wishes at this time to go on record in favor of this investigation and pledges its support to assist in bringing information and facts before the commission when such action will likely be most opportune.

A copy of the above resolution was sent to the commission and in a recent reply by the supervisor of telephones, we are informed that while the commission has not as yet issued a formal order covering the investigation above referred to, it is now and for some time past has been gathering information to aid it in an investigation of the long distance rates of the two large toll companies in this state, and that it intends to pursue the investigation with all possible thoroughness and diligence.

APPLICATION OF THE TRI-STATE TELEPHONE AND TELERRAPH COMPANY TO INCREASE ITS LOCAL RATES AT MOOSE LAKE.

An application has been filed by the Tri-State Telephone and Telegraph Company, in which it is alleged that the local community desires continuous day, night and Sunday service, whereas it is getting now only day service and certain hours on Sunday; that 36 subscribers, representing 43 telephones out of the total of 74 local telephones have signed a petition in favor of the change of service and approving the proposed new rate, should the change be made. That in order to furnish the additional service it will be necessary to increase the private line business telephone rate from $1.50 to $2.00 per month and the private line residence rate from $1.25 to $1.50 per month, all other rates to remain as at present.

The commission ordered a hearing to be held in the village hall at Moose Lake, on the 27th of June at 1:30 o'clock, so that all interested parties could appear at that time and give evidence for or against the granting of the application. Notice of the hearing was served upon the officers of the Tri-State Company and by publication in the Moose Lake *Star Gazette*.

PETITION FOR A REDUCTION IN THE TOLL RATE BETWEEN LAKE CITY AND THE TWIN CITIES.

Under date of June 14, the commission has ordered a hearing in the above matter to be held at its office in the State Capitol, St. Paul, on Thursday, June 29, at 10:30 o'clock and all parties that may be interested should appear and give evidence for or against the granting of the application. Notices of the hearing have been served upon the officers of the Commercial Club of Lake City, the Northwestern Telephone Exchange Company and the Tri-State Telephone and Telegraph Company.

Mankato Statement on January 1. 1916

MANKATO CITIZENS TELEPHONE CO.
Incorporated 1898.

OFFICERS.

H. A. Patterson ..... President
Nic Petersen ..... Vice-President
W. D. Willard ..... Secretary and Treasurer
S. B. Wilson ..... Attorney
P. M. Ferguson ..... Manager

TELEPHONES IN OPERATION.

March, 1899	250
March, 1916	3667

STATEMENT OF ASSETS AND LIABILITIES AS AT JANUARY 1, 1916.

ASSETS.

Plant	$225,169.42
Accounts Receivable	4,348.80
Stores Account	4,212.08
Toll Accrued, etc.	595.74
Cash on Hand	405.02
Petty Cash Account	100.00
Advance Expense Account	20.00
	$234,851.06

LIABILITIES.

Capital Stock	$144,650.00
Depreciation Reserve	45,939.66
Bills Payable	6,100.00
Taxes Accrued	2,129.80
Salaries Accrued	862.16
Profit and Loss	34,700.02
First National Bank	336.28
National Citizens Bank	133.14
	$234,851.06

OPERATING INCOME 1915.

Exchange Rentals	$ 57,120.79
Toll System	2,367.99
Earnings from Connecting Lines	1,504.75
Commission from Tri-State Company	2,076.87
Rents from Pole and Wire Privileges	236.40
Ads in Directory	261.50
Total Operating Income	$ 63,568.30
Maintenance	$ 9,200.37
Expense: Traffic	8,638.38
Commercial	2,103.89
General	6,953.85
Reconstruction	1,015.27
Taxes	2,129.80
Rents Paid	186.00
Total Expense	$ 30,227.56
Net Operating Income	$ 33,340.74
Deduct Depreciation	10,984.73
	$ 22,356.01
Add. Rents from Building	99.96
Misc. Non-Operating Revenues Stores Sold	99.01
Purchase Discounts	171.80
	$ 22,726.78
Deduct Interest on Bills Payable	614.08
	$ 22,112.70
Deduct Dividends Paid	10,846.55
	$ 11,266.15
Deduct Uncollectable	216.49
Surplus for Year	$ 11,049.66

Report of Fulda Company for year ending Dec. 31, 1916

FULDA TELEPHONE COMPANY.
FULDA, MINNESOTA
(Incorporated 1901)
Authorized Capital $150,000.00
Paid In Capital, $100,000.00

OFFICERS

C. H. Helweg ..... President
M. J. Dickson ..... Vice-President
J. J. Schueller ..... Treasurer
F. D. Lindquist ..... Secretary

DIRECTORS

J. F. Liepold ..... Heron Lake, Minnesota
C. W. Becker ..... Wilmont, Minnesota
J. B. Ludlow ..... Rushmore, Minnesota
F. R. Geyerman ..... Brewster, Minnesota
Chas. Nienaber ..... Round Lake, Minnesota

MANAGER

F. D. Lindquist ..... Fulda, Minnesota

SUPERINTENDENT OF MAINTENANCE

Ed. Guthier ..... Fulda, Minnesota

DIVISION SUPERINTENDENTS

Ed. Madson ..... Westbrook, Minnesota
C. J. Hultquist ..... Dundee, Minnesota
Grove Snyder ..... Rushmore, Minnesota
Otto Deutschman ..... Brewster, Minnesota

OPERATING DEPARTMENT.

RECEIPTS.

SUNDRY RECEIPTS.

Cash on hand at beginning of year	$ 4,222.25	
Sale of Supplies and Sundries	781.00	
Refund on Autos bought	250.00	
1,000 Shares of Stock sold	25,000.00	
20 per cent Premium on Stock sold	5,000.00	
Bills Payable Issued	5,500.00	$40,753.25

EARNINGS COLLECTED.

Telephone Rent Collected	$33,021.74	
Commissions and Terminal Fees	2,005.80	
Toll and Connecting Charges	1,671.27	
Directory Advertising	521.50	
Rebates	142.60	
Miscellaneous Receipts	4.36	$37,367.27
Total to be accounted for.		$78,120.52

DISBURSEMENTS.

OPERATING EXPENSE.

Salaries Paid	$10,424.20
Rents Paid	1,246.99
Road Expense Trouble Men	1,543.95
Fuel and Office Expense	412.46
Stationery and Printing	85.49
1915 Directory	375.00
Freight, Express and Dray	70.44
Taxes	1,216.21
Postage	129.96
Supplies Used	1,142.69
Pole Rent and Connections	51.29
Refund Rent Overpaid	73.35
Donations	2.00
Interest Paid	222.64
Notes Charged Off (Worthless)	54.60
Sundry Expense Items	262.82
Total Operating Expense	$17,314.09

SUNDRY DISBURSEMENTS.

Bills Payable Paid	$ 5,500.00
Autos Bought	2,235.78
Supplies Bought for Re-Sale	246.00
Transferred to Construction Account	33,238.66
1915 Dividends Paid	7,500.00
Cash on hand at Close of Year	12,085.99 $60,806.43
Total	$78,120.52

STATEMENT OF EARNINGS.

Gross Earnings	$ 37,367.27	37- Per Cent
Less Operating Expense	17,314.09	17- Per Cent
Net Earnings	20,053.18	20- Per Cent

Operating Expense 46- per cent of Gross Earnings.

DISPOSITION OF EARNINGS.

Allowance for Depreciation, 7.9- per cent on 1914 Valuation of Lines and Telephones	$ 6,553.18	
Reserved for 1916 Dividends	10,000.00	
3.5 per cent transferred to Undivided Profit Account	3,500.00	
Total		$ 20,053.18

INVENTORY.

2,866 Telephones at $34.53	$ 98,989.01	
150 Miles Iron Toll Lines, Metallic	7,500.00	
70 Miles Iron Toll Lines, Grounded	700.00	
22 Miles Copper Toll Lines, Metallic	1,500.00	
Autos, Horses, Wagons, Tools and Office Supplies	3,225.00	
Book Accounts	1,000.00	
Cash in Bank	12,085.99	
Total		$125,000.00

INVENTORY DECEMBER 31, 1914.

Lines and Telephones	$ 82,007.20	
1915 Purchase and New Construction	$ 33,234.99	
Autos, Horses, Wagons, Tools and Office Furniture and Supplies	3,225.00	
Book Accounts	1,000.00	
Cash in Bank	12,085.99	
Total	$131,553.18	
Allowance for Depreciation	6,553.18	
Net value		$125,000.00

STATEMENT OF PROFIT AND LOSS ACCOUNT.

Undivided Profit from Last Report	$ 6,500.00	
1915 Earnings, Net	3,500.00	
Premium on Stock Sold	5,000.00	
Total Undivided Profits		$ 15,000.00

FINANCIAL STATEMENT.

RESOURCES.

Inventory	$125,000.00	
		$125,000.00

LIABILITIES.

Capital Stock	$100,000.00	
Undivided Profits	15,000.00	
Reserved for 1916 Dividends	10,000.00	
		$125,000.00

ESTIMATED RECEIPTS FOR 1916.

Telephone Rent 2,866 Telephones	$3,046.00	
Tolls, Commissions and Connection Fees	354.00	
Total Monthly Income (Estimated)		$3,400.00

ESTIMATED OPERATING EXPENSE.

Salaries per Month	$1,092.00	
Office Rent	118.17	
Sundry Expense Estimated	339.83	
Total Monthly Operating Expense (Estimated)		$1,550.00
Net Monthly Earnings (Estimated)		$1,850.00

NUMBER OF TELEPHONES.

EXCHANGES.

Kinbrae	16
Reading	25
Storden	40
Dundee	44
Round Lake	66
Wilmont	73
Rushmore	81
Brewster	93
Westbrook	135
Fulda	189
Heron Lake	204
	966

RURAL TELEPHONES.

Division No. 1	403
" No. 2	403
" No. 3	362
" No. 4	384
" No. 5	348
Total	1,900
	2,866

Average Monthly Rental per Telephone $1.06

CONSTRUCTION ACCOUNT

RECEIPTS

Transferred from Operating Department	$33,238.66
	$33,238.66

DISBURSEMENTS

Paid Overdraft from last Report	3.67
Paid Material and Freight	29,990.98
Paid Labor and Expense	3,244.01
	$33,238.66

Number of Telephones at beginning of year	2,240
Installed during year	626
Total Number of Telephones	2,866

626 Telephones Installed	$28,370.00
35 Miles Iron Toll Line, Metallic	2,100.00
10 Miles Iron Toll Line, Grounded	100.00
Rebuilding Exchanges and Rural Lines	2,664.99
Total paid for 1915 Construction	$33,234.99

ASSOCIATION NEWS ITEMS.

NASS: The telephone line between Nass and Celina has been repaired and is now in good working condition.

BIG FORK: The Big Fork Telephone Company is about to erect a new central office building.

EVERGREEN: The farmers in the neighborhood of Evergreen have organized a telephone company and it is planned to build at once and connect with the Big Fork Exchange.

LAKEVILLE: It is reported that the Tri-State Telephone and Telegraph Company intends to extend its toll line from Farmington to Lakeville this spring.

AVON: The Avon Telephone Company is about to commence work on its new line to Collegeville.

DEERWOOD: The common council has granted the Tri-State Telephone and Telegraph Company permission to build its new toll line through Deerwood.

NORTHOME: G. A. Semon, one of the merchants at Mizpah, is planning to build a telephone line of his own from Mizpah to Northome and will probable install, at the same time, a local exchange at Mizpah.

BRAINERD: At a recent meeting of the Oak Lawn Rural Telephone Company held here for the purpose of considering the question of city connections, the officers were instructed to enter into a contract to connect with the local exchange of the Northwestern Telephone Exchange Company for such services.

BRANDON: The Alexandria Telephone Company is rebuilding its lines in this village.

CHISHOLM: The lines of the Mesaba Telephone Company were recently damaged by the high wind.

OAKLAND: The Bell Telephone Company now has a crew repairing its lines between Oakland and Albert Lea.

CANNON FALLS: The Cannon Falls Telephone Company is preparing to string another heavy circuit from Cannon Falls to Northfield in order to take care of its increasing long distance toll business.

SAUK CENTER: Work is about to be commenced by the Bell Company in its new toll line Little Falls to Sauk Center.

HIBBING: The Commercial Club is in favor of the proposed Bear River telephone line project.

ARGYLE: The Argyle Telephone Company will commence at once the rebuilding of all its lines in the village.

AUSTIN: The Bell Company is planning on improving its local lines at a cost of about $40,000.

FERTILE: The Garden Valley Telephone Company is about to rebuild its exchange in this village.

MORGAN: The Redwood County Rural Telephone Company is about to move its local telephone office to its new location in the new State Bank building. It is also the intention to rebuild when the move is made.

AVON: Articles of incorporation have just been filed for the Avon Rural Telephone Company with capital stock of $5,000. The incorporators are: B. J. Keppers, A. E. Welle, Peter Machtenas, and others.

MANKATO: Plans for the remodeling of the Citizens Telephone Company's system have been drawn by H. Gerlech.

ST. PAUL: At the recent annual meeting of the Tri-State Telephone and Telegraph Company all of the old officers were re-elected and in addition, E. B. Wells, of Minneapolis, one of the directors, was elected second vice-president.

PARK RAPIDS: A new telephone line is about to be built in order to connect the farmers south of town with the local exchange at Park Rapids.

ELYSIAN: The Cannon Valley Telephone Company is planning to remodel its building at this place, used as a local exchange and occupied by Mrs. Warner.

LIBBY: The Pioneer Co-Operative Telephone Company is making arrangements to build from McGregor to Libby.

SAUK CENTER: At the recent annual meeting of the State Road Telephone Company, the following officers were elected for the ensuing year: William Elliot, president; George Gundman, vice-president, and Clark Wilcox, secretary.

VIRGINIA (SAND LAKE): The Virginia-Cook Telephone Company is about to build a line to Sand Lake.

CLARKFIELD: The Clarkfield Telephone Company intends to build additional rural lines in the vicinity of Swede Prairie as soon as certain work in Clarkfield has been taken care of.

BIRD ISLAND: The Tri-State Telephone and Telegraph Company has been making many improvements in its local exchange in this place.

FAIRMONT: The Fairmont Telephone Company has a crew of men at work stringing cable in the business portion of this city.

REDWING: The Bell Company is planning to make extensive changes in its local system.

FULDA: It has just been learned that the wife of F. D. Lindquist, secretary of the Fulda Telephone Company and also vice-president of the M. I. T. A., has undergone a very serious and successful operation at Rochester, Minnesota, and will leave in a few days for home.

FARIBAULT: W. T. Mollison, the local manager of the Tri-State exchange, has just been elected colonel of the Second Regiment, Minnesota National Guard, to succeed Colonel John Bueschers, of New Ulm. The new colonel has been a member of the guard for 34 years, having enlisted when 16 years old as a private in Company G, of Austin. He was elected major six years ago, which position was retained until the recent promotion to colonel.

BRUSHVALE: John Holecek has purchased a telephone line from the Northwestern Telephone Exchange Company extending from Breckenridge to Manson, which will be used for a rural line.

PIERZ: The Lastrup Rural Telephone Company, just organized, has purchased 14 miles of rural line from the Northwestern Telephone Exchange Company, which it will continue to use for that purpose and connecting with the local exchange at Pierz.

ST. JOSEPH: The St. Wendell Rural Telephone Company, which has just been incorporated, has purchased from the Northwestern Telephone Exchange Company two of its rural lines running out of St. Joseph. This line will continue to connect with the local exchange.

DODGE CENTER: J. R. Springsted, owner of the Dodge Center Telephone Exchange Company, has bought from the Northwestern Telephone Exchange Company the old toll line between Dodge Center and West Concord, which will be used for rural purposes.

HAYFIELD: W. W. Springsted, owner of the Hayfield Telephone Company, has recently purchased a piece of old toll line from the Northwestern Telephone Exchange Company between Hayfield and Oslo.

ST. CROIX FALLS, WIS.: The Arcola Telephone Company of St. Croix Falls has purchased 5½ miles of metallic circuit from the Northwestern Telephone Exchange Company out of Stillwater, which will be used for farm line purposes.

WILLOW RIVER: T. T. Bakke, of Pettibone, N. D., has purchased from M. L. Melberg the Willow River Telephone Company, which covers an exchange at Willow River and farm lines in the vicinity.

KASSON: The Farmers Interurban Telephone Company, of Kasson, has purchased an old toll line from the Northwestern Telephone Exchange Company between Byron Junction and Oslo, which will be used for rural purposes.

LITTLE FALLS: A. J. Gospoda and others have purchased from the Northwestern Telephone Exchange Company a portion of old toll line between Fawndale and Little Falls, which will be used for rural purposes and connect with the Little Falls Exchange, as the Northwestern Company has built a new toll line between Sauk Center and Little Falls.

Cost of Wire Affects National Forests

With bids for furnishing wire to the Forest Service recently advanced 45 per cent, and prices on other equipment considerably increased, material curtailment of the program for telephone line construction on the national forests this summer is said to be in prospect. There are over 20,000 miles of telephone line on the national forests and approximately 2,000 miles of new line was planned.

A certain amount of wire is required also for upkeep, since the lines are peculiarly subject to breakage from falling trees and similar causes. Every spring the forest rangers have to get the lines in order in preparation for the fire season and although, to lessen the effects of accident, the wires are mostly run on swinging insulators suspended from the trees, there are in the aggregate a large number of repairs to be made.

Notwithstanding the number of telephone lines already built, large areas are still without means of communication and consequently lacking in proper equipment for fire protection. Not only are the telephones used by the forest officers, but they are a great convenience to the public. Very often, it is said, they enable isolated settlements to have a means of communication which they could secure in no other way.

Preservative Treatment of Poles

Presented Before the American Institute of Electrical Engineers—Concluded from June

BY F. L. RHODES AND R. F. HOSFORD

THE experimental series placed in the Buffalo-Warren line was made up wholly of chestnut poles. These poles had been prepared in two groups. One group was collected at Thorndale and Paoli, Pa.; the other at Dover and Mt. Arlington, N. J.

The Thorndale-Paoli group consisted of equal numbers of treated and untreated poles. About one-third of the treated poles had been subjected to the open tank process. Four-fifths of the open tank poles had been seasoned prior to treatment; one-fifth were treated in the "green" state. About two-thirds of the treated poles had been given a brush treatment; all of these poles had previously been seasoned. When this group was installed, treated and untreated poles were placed alternately in the line. The exact order of setting is shown in Table XI, which covers a sub-series of 34 poles. There were 24 sub-series in the group. No attention was given to period of seasoning in arranging the poles for setting.

The Dover-Mt. Arlington group consisted of about three-fifths treated and two-fifths untreated poles. A little less than one-third of the treated poles were prepared by the open tank process; all but one of these had been seasoned before treatment. The other treated poles had received a brush treatment after seasoning. Nearly all of the untreated poles had been seasoned. These poles were not set in any regular order and were scattered in groups of irregular size among untreated poles brought from other sources.

Two inspections have been made to determine the condition of the experimental poles in the Buffalo-Warren line. The first was made in September, 1910, about five years after the line was built. The second inspection was made three years later in September, 1913. The methods of inspection employed have already been described in connection with the Savannah-Meldrim line. Table XII sets forth in summarized form the data relating to individual poles accumulated in these inspections. No poles have decayed to an extent necessitating reconstruction. The tables therefore show only the proportion of sound specimens noted and the magnitude of the circumference changes. Summarized data bearing on the seasoning and treatment of the poles are also included.

TABLE XI.

No. of pole	*Condition when set*	*Preservative applied*	*Method of treatment*
1	Seasoned	Preservative "A"	Brush
2	Seasoned		Untreated
3	Seasoned	Preservative "A"	Brush
4	Green		Untreated
5	Seasoned	Preservative "B"	Brush
6	Seasoned		Untreated
7	Seasoned	"Preservative "B"	Brush
8	Green		Untreated
9	Seasoned	Dead Oil of Coal Tar	Brush
10	Seasoned		Untreated
11	Seasoned	Dead Oil of Coal Tar	Brush
12	Green		Untreated
13	Seasoned	Dead Oil of Coal Tar	Open-tank
14	Seasoned		Untreated
15	Seasoned	Dead Oil of Coal Tar	Open-tank
16	Green		Untreated
17	Seasoned	Preservative "E"	Brush
18	Seasoned		Untreated
19	Seasoned	Preservative "E"	Brush
20	Green		Untreated
21	Seasoned	Dead Oil of Coal Tar	Open-tank
22	Seasoned		Untreated
23	Seasoned	Dead Oil of Coal Tar	Open-tank
24	Green		Untreated
25	Seasoned	Preservative "F"	Brush
26	Seasoned		Untreated
27	Seasoned	Preservative "F"	Brush
28	Green		Untreated
29	Seasoned	Coal-tar	Brush
30	Seasoned		Untreated
31	Seasoned	Coal-tar	Brush
32	Green		Untreated
33	Green	Dead Oil of Coal Tar	Open-tank
34	Seasoned		Untreated

NOTE: The above series was repeated 24 times, series No. 2 beginning with pole No. 35, series No. 3 with pole No. 69, etc.

It will be noticed that while decay had begun on practically all untreated poles when the first inspection was made, the decreases in circumference average much lower than in the Savannah-Meldrim line. The number of brush treated poles remaining sound in 1913 is a little less than 50 per cent of the total number installed. Only slight changes in the condition of the open tank treated poles installed have been noted and only a little over one per cent of the poles show these changes in condition.

Omaha-Denver line.—The plans for the service tests of butt treated poles included, in addition to the series placed in the two lines already described, two other experimental groups which were to be prepared independently. Four hundred and sixty-five Eastern white cedar *(thuya occidentalis)* poles were collected at Escanaba, Mich., and held for seasoning until the latter part of 1906. Approximately three-fifths of the poles were then treated, about one-third being subjected to the open tank treatment and the remaining two-thirds being about equally divided for brush treatment by two different preservatives.

Five hundred and forty-two chestnut poles were at the same time collected at Parkton, Md. After the process of seasoning had been studied with these poles one-third were given an open tank treatment and another third a brush treatment, two different preservatives being employed in this latter case.

Both the Escanaba and the Parkton poles were finished at a time when an opportunity of placing an experimental group of poles consecutively in line could not easily be found. The two lots of poles were held for three years awaiting a suitable occasion for their installation. When plans were completed for setting them in 1910 it was felt that the long period of holding might have produced changes affecting the efficiency of their preservative treatments. As the plans for building the Omaha-Denver line of the American Telephone and Telegraph Company, in which these two experimental groups were to be used, called for the brush treatment of several thousand Eastern white cedar poles, the construction work was arranged so that the brush treatment of several hundred poles was carried out under observed conditions. Dead oil of coal tar was applied to about half of the poles thus treated and a high boiling distillate of coal gas tar (preservative A) was applied to the remainder. Untreated poles were set aside in sufficient number to permit of setting one untreated pole for each two brush treated poles of this third experimental group. The poles included in this group had all been held in storage for a long time and were consequently well seasoned.

The Parkton poles were set near the eastern end of the new construction. The Escanaba poles were placed next in the line and next to them about two-thirds of the experimental lot prepared at the time of building the line. No exact order was followed in placing the Parkton and the Escanaba poles but a reasonably uniform distribution of the three types of treatment and of the untreated poles was attained. About half of the freshly treated poles were so installed as to give uniform series with each of the three methods of preparation grouped independently of the others. The other half of the poles were set so that an untreated pole alternated between each of the two types of brush treated poles. About 300 poles of the 1910 experimental group were given a location some 200 miles west of the other experimental poles near North Platte, Neb. These poles were set so as to bring an untreated pole between each of the two kinds of brush treated pole.

The installation of these experimental poles was completed in 1910. The first inspection to determine condition was made in 1914 after four years' exposure. The results of this inspection are given in Table XIII.

It will be noticed that nearly all of the poles subjected to the open tank treatment show no change in condition. The brush treated poles show relatively much greater percentages affected by decay than was the case

TABLE XII—DATA ON THE EXPERIMENTAL CHESTNUT POLES IN BUFFALO-WARREN LINE.

	Preservative applied for preparation, if untreated.	No. of coats of preservative applied	No. of poles under observation	Amount of oil applied per pole (lbs.) Ave.	Max.	Min.	Period of seasoning (mos.) Max.	Min.	Poles sound at inspection in the year. 1910 No. of poles	1910 Per cent of No. under observation	1913 No. of poles	1913 Per cent of No. under observation	Decrease in ground line circumference (inches) Average including sound poles 1910	1913	Average omitting sound poles 1910	1913	Decrease in ground line circumference (ins.) bet. inspections for poles unsound at preceding inspec. 1910-1913 No. of poles	Ave.
Poles obtained at Thorndale and Paoli, Pa.	Preservative "A"	2	48	4.5	5⅞	2¼	29	15	42	88.	28	58.	0.05	0.19	0.40	0.46	6	0.29
	Preservative "B"	2	48	4.0	6¼	3	25	15	39	81.	17	35.	0.06	0.37	0.30	0.58	9	0.60
	Preservative "E"	2	20	5.5	6⅜	4¼	25½	22	17	85.	3	15.	0.08	0.42	0.54	0.49	3	0.46
	Preservative "E"	1	21	2.4	3⅝	1¾	21	16	1	5.	0	0.	0.42	1.4	0.44	1.4	20	1.0
	Preservative "F"	2	32	7.6	9⅜	5½	25½	19	8	25.	0	0.	0.53	1.5	0.71	1.5	24	0.99
	Preservative "F"	1	16	3.4	4¼	2⅞	18	15	0	0.	0	0.	0.91	1.9	0.91	1.9	16	0.97
	Dead oil of coal tar	2	54	7.3	11¾	4⅛	26	15	48	89.	30	56.	0.02	0.28	0.15	0.63	6	0.54
	Dead oil, open tank, seasoned	..	91	22.2	44	9	26	22	91	100.	91	100.	0.00	0.00	0.00	0.00	0	....
	Dead oil, open tank, green	..	28	14.7	39	4	....	..	28	100.	27	96.	0.00	0.01	0.00	0.13	0	....
	Tar brushed	1	48	....	....	...	28	18	1	2.	0	0.	0.96	2.1	0.99	2.1	47	1.1
	Untreated—seasoned	..	214	....	....	...	26	15	0	0.	0	0.	0.97	2.1	0.97	2.1	214	1.1
	Untreated—green	..	194	....	....	...	....	..	0	0.	0	0.	1.2	2.3	1.2	2.3	194	1.1
Poles obtained at Dover and Mt. Arlington, N. J.	Preservative "A"	2	18	4.8	6¾	3⅝	34½	26	17	94.	15	83.	0.01	0.08	0.13	0.46	1	0.13
	Preservative "A"	1	8	2.0	2¼	1⅛	29	28	5	63.	0	0.	0.23	1.5	0.62	1.5	3	1.5
	Preservative "B"	2	18	5.4	6⅝	4½	34½	26	18	100.	16	89.	0.00	0.05	0.00	0.44	0	....
	Preservative "B"	1	10	3.6	5⅛	1⅜	29	27	8	80.	1	10.	0.08	0.64	0.44	0.71	2	1.1
	Preservative "E"	2	29	5.4	6⅝	3¼	34½	26	23	79.	15	52.	0.04	0.40	0.17	0.83	6	1.0
	Preservative "F"	2	31	7.7	10⅝	5½	34½	26	12	39.	1	3.	0.29	1.2	0.48	1.2	19	0.94
	Dead oil of coal tar	2	30	8.3	10⅞	6½	35	26	28	93.	25	83.	0.01	0.05	0.13	0.27	2	0.05
	Dead oil, open tank, seasoned	..	62	23.0	44	8	34½	26	62	100.	61	98.	0.00	0.01	0.00	0.13	0	....
	Dead oil, open tank, green	..	1	29.	....	....	....	..	1	100.	1	100.	0.00	0.00	0.00	0.00	0	....
	Untreated—seasoned	..	136	....	....	....	36½	26	1	1.	0	0.	1.1	2.3	1.1	2.3	135	1.3
	Untreated—green	..	6	....	....	....	....	..	0	0.	0	0.	0.62	2.6	0.62	2.6	6	2.0

TABLE XIII—DATA ON THE EXPERIMENTAL POLES IN THE OMAHA-DENVER LINE.

	Preservative applied or preparation if untreated	No. of coats of preservative applied	No. of poles under observation	Quantity of oil applied per pole (lbs.) maximum	Quantity of oil applied per pole (lbs.) average	Quantity of oil applied per pole (lbs.) minimum	Period of seasoning (mos.) maximum	Period of seasoning (mos.) minimum	Poles sound. No. of poles	Poles sound. Per cent of number under observation	Decrease in ground line circumference, av. (inches), omitting sound poles	Decrease in ground line circumference av. (inches), including sound poles	Poles damaged by wood-boring larvae, No. of poles	Poles damaged by wood-boring larvae, per cent of No. under observation
Chestnut poles treated at Parkton, Md.	Preservative "A"	2	91		4.9		21	11	35	38.	0.68	1.1	40	44.
	Dead oil of coal tar	2	91		4.7		21	11	8	9.	1.9	2.1	52	57.
	Dead oil (open tank)	..	181		21.		21	11	179	99.	0.01	0.87	1	½
	Untreated	..	179		..		21	11	0	..	3.5	3.5	96	54
Cedar poles treated at Escanaba, Mich.	Preservative "A"	2	91	7	3.9	2	18	11	64	70.	0.40	1.3	..	..
	Dead oil of coal tar	2	95		4.4		18	11	24	25.	1.5	2.0	..	..
	Dead oil (open tank)	..	137	90	48.	30	18	11	136	99.	0.01	0.50	..	..
	Dead oil (open tank)	..	42		12½		..	..	41	98.	0.01	0.13	..	..
	Untreated	..	100		..		18	11	0	..	3.1	3.1	..	..
Cedar poles treated near North Platte, Neb., before installing in line	Preservative "A"	2	98		0.87		not recorded		71	72.	0.51	1.9	..	..
	Dead oil of coal tar	2	98		0.81				68	69.	0.55	1.8	..	..
	Untreated	..	97	..					0	..	1.8	1.8	1	1
Cedar poles treated near Lincoln, treated and untreated poles set alternately in the line	Preservative "A"	2	78	(not recorded)			not recorded		21	27.	1.4	2.0	..	..
	Dead oil of coal tar	2	87		2¾				30	34.	1.3	2.0	..	..
	Untreated	..	77		..				1	1.3	3.0	3.1	..	..
Cedar poles treated near Lincoln, poles of each treatment set consecutively in separate sections of the line	Preservative "A"	2	83	(not recorded)			not recorded		31	37.	0.67	1.1	..	..
	Dead oil of coal tar	2	90	(not recorded)					45	50.	0.81	1.8	..	..
	Untreated	..	100		..				0	..	3.1	3.1	..	..

with corresponding treatments in either of the other two lines reported upon. The greater proportion of decay with the poles brush treated with dead oil of coal tar included in the groups treated at Parkton and Escanaba probably has some connection with the relative volatilities of dead oil of coal tar and of preservative A. The dead oil of coal tar contains a substantially greater proportion of low boiling constituents than preservative A so that with the exposure of the treated poles to the sun and air for three years a considerable reduction in the amount of preservative retained by the pole may well have occurred. A rather severe tendency to checking was also noticed which is particularly marked in the case of some of the chestnut poles from Parkton. Poles which have reached the limit of air seasoning still retain large percentages of moisture in their interior sections. It is possible that this internal moisture began to evaporate in the relatively dry climate of Nebraska and this evaporation may be the cause of the heavy checking.

Better results in the way of preservation were obtained in the case of the poles treated when the line was built. Here there is very little distinction between the results obtained with the two kinds of preservative used. It is to be noted that the poles treated had been held for rather long periods and were very likely held beyond the time necessary for seasoning. As will be pointed out subsequently, holding for a period much longer than that needed to bring about seasoning is disadvantageous from the standpoint of obtaining the best results in the way of preservation.

Another feature of interest brought out in the inspection of this line is the large proportion of chestnut poles in which boring beetles (parandra brunnea) were found. It has not been possible to determine whether these insects entered the poles after their setting or whether they first entered some of the poles at a point of storage and distributed themselves along the line after setting.

It will be noticed that the rate of decay, as indicated by the change in circumference, is relatively rapid. The average circumference change for treated poles showing decay would indicate that on many of these poles decay began not long after their setting.

Discussion of Experience with Butt-Treated Poles.—The choice of treated poles in preference to untreated poles for constructing a line must necessarily be based on some expectation of an advantage to be gained. Ordinarily the advantage looked for would be longer life for the treated poles as compared with the untreated. A close determination of the gain in life due to treatment can only be secured when it is possible to compare the complete life history of a series of treated poles with that of a series of untreated poles exposed under comparative conditions.

It will be seen that the experience which we have just described has not been long enough to give the complete life history of any of the experimental series. It has, however, been long enough to substantiate the expectation that butt treatments will increase the life of poles and to yield considerable information of value to any one contemplating the use of treated poles.

The open tank treated poles show a negligible amount of impairment up to the date of the latest inspections. The superiority of the results obtained with the open tank poles as compared with the brush treated poles placed in the same localities is evident. Since so little change in condition has occurred in the case of the open tank poles, it is, however, impossible to find a basis for formulating an opinion as to what may be expected from these poles as the experiment continues. While therefore there is no question but that the best results in the butt treatment experiments are to be credited to the open tank treated poles, the data obtained from the brush treated poles yield much more information relative to the limitations of that process, so that we shall find it necessary to confine further discussions to the brush treatment.

A glance at the tables of results obtained with brush treatments in the different experimental series will show that the application of the treatment to poles has retarded the beginning of decay for a considerable number of years. A question immediately occurs, however, as to whether the rate of decay for treated poles may not be greater than for untreated poles so that the advantage due to this retardation of its incidence could ultimately be lost.

Some answer to this question is afforded by the data which we have been able to gather. In the case of one

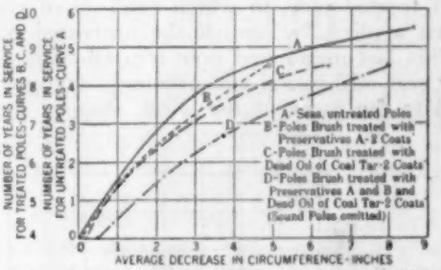

NUMBER OF YEARS IN SERVICE FOR TREATED POLES-CURVES B, C, AND D
NUMBER OF YEARS IN SERVICE FOR UNTREATED POLES-CURVE A
A-Seas. untreated Poles
B-Poles Brush treated with Preservatives A-2 Coats
C-Poles Brush treated with Dead Oil of Coal Tar-2 Coats
D-Poles Brush treated with Preservatives A and B and Dead Oil of Coal Tar-2 Coats (Sound Poles omitted)
AVERAGE DECREASE IN CIRCUMFERENCE-INCHES

Fig. 1—Rate of Decay, Juniper Poles—Savannah-Meldrim Line.

experimental group, the juniper poles placed in the Savannah-Meldrim line, all but a few of the untreated specimens had, at the date of the last inspection, in 1913, reached the end of their serviceable life. By far the greater part of the treated specimens were still in serviceable condition at the 1913 inspection, so that in this one case we have direct evidence that an increased life will result from the treatment.

While substantial percentages of treated poles in all of the other experimental groups are still sound, decay on the corresponding untreated poles has not advanced so far as to have brought a majority of them to the end of their serviceable life. The data accumulated with respect to changes in the circumference of sound wood afford, however, an indication of what may be expected in the future from these experimental groups. To illustrate the application of the circumference data, Fig. 1 and Fig. 2 are submitted. In Fig. 1 the average decrease in circumference is plotted against years of exposure for seasoned untreated juniper poles and for juniper poles brush treated with preservative A and with dead oil of coal tar. As a divisor which includes sound poles and poles which are decaying is necessarily used in obtaining the average decrease in circumference for the brush treated poles, we show also a curve for the average decrease in circumference of poles on which decay has started, combining in this case the results obtained with preservatives A and B, and dead oil of coal tar, in order to include enough poles to insure representative results. In order to bring the curves for untreated and treated poles close together the scale for years of exposure of the treated poles has been shifted. Fig. 2 gives similar curves for the chestnut poles in the Savannah-Meldrim line. It will be seen on comparison of these curves that up to date no indication has been given that decay will

proceed more rapidly on treated poles, once it starts, than it does upon untreated poles. The indications are, therefore, that any gains due to the retardation of the beginning of decay through treatment, will be retained.

Before concluding with this branch of the subject it seems worth while to describe an excellent illustration of the practical value of treated poles. The Savannah-Meldrim line was exposed to a severe wind storm in August, 1911, which caused the breaking of twelve consecutively placed poles in the juniper section of the experimental series. Six of the twelve poles were untreated. Four more had been treated with coal tar and, as already noted, poles receiving this treatment have decayed very much as if they had received no treatment at all. All of these ten poles and one other pole which had been treated with preservative E had decayed to an extent requiring reconstruction, but the work of reconstruction had not at the time been performed. The twelfth pole which had received a brush treatment with dead oil of coal tar, was only slightly above the replacement dimensions for the line and was separated from the next treated pole, to which dead oil of coal tar had also been applied, by one of the untreated poles which fell. This last-mentioned pole treated with dead oil of coal tar was still sound and although unguyed and fully exposed to the force of the wind, stopped the break in its direction. In the other direction another brush treated pole which had suffered only slightly from decay also stopped the break, although it again was unguyed and exposed to the full force of the wind.

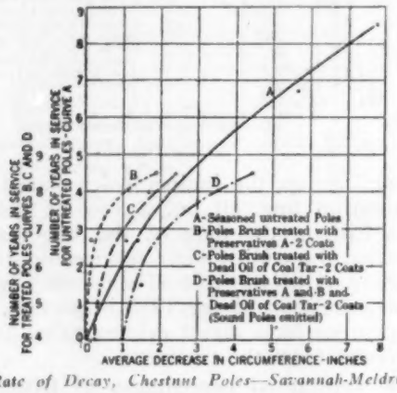

NUMBER OF YEARS IN SERVICE FOR TREATED POLES-CURVES B, C AND D
NUMBER OF YEARS IN SERVICE FOR UNTREATED POLES-CURVE A
AVERAGE DECREASE IN CIRCUMFERENCE-INCHES
A-Seasoned untreated Poles
B-Poles Brush treated with Preservatives A-2 Coats
C-Poles Brush treated with Dead Oil of Coal Tar-2 Coats
D-Poles Brush treated with Preservatives A and B and Dead Oil of Coal Tar-2 Coats (Sound Poles omitted)

Fig. 2—Rate of Decay, Chestnut Poles—Savannah-Meldrim Line.

Increase in Life.—In the present state of our information only approximate estimates can be given of the effect of brush treatment in increasing the life of poles. When all of a given group of poles have completed their period of service the computation of their average life is simple. The same method of computation can be applied when the number of poles in a group still left in service represents only a small percentage of the poles originally exposed as fairly large errors can be made in estimating the expectation of life for the poles still in service without causing any substantial deviation in the average life for the group.

The only groups of poles in the several experimental series which have deteriorated to a point where this method of computation can safely be applied are the untreated seasoned and "green" juniper poles in the Savannah-Meldrim line. The results of such a computation for these two groups of poles are shown in Table XIV, which indicates an average life of seven and two-tenths years for the seasoned untreated juniper poles placed in this line and an average life of seven and five-tenths years for the "green" untreated poles placed in this line. The conditions to which poles placed in this line are exposed were known to be unusually severe when the experiment was started and the location was chosen because of this. In spite of the very severe conditions of exposure none of the other experimental groups in this line have deteriorated to a point where we can find a basis for applying the same method of computation to determine their life.

One other method for estimating the gain in life due to treatment remains. It is based on the evidence illustrated in Fig. 1 and Fig. 2, indicating that when decay starts in a treated pole it does not proceed at any higher rate than in an untreated pole. If the rate of decay for treated poles is not greater than it is for untreated poles the number of years elapsing before the treated poles begin to decay will yield an approximate indication of the gain in life; as, under average conditions, not many months should elapse after setting before untreated poles show at least some slight signs of decay. Computations of the average years to the beginning of decay for several of the experimental groups are shown in Table XV. It will be seen from the table that in the case of some of the experimental groups so many poles were still sound when last inspected as to make the estimate of the time at which decay would begin exercise considerable influence upon the results of the computation. The figures may also be from six months to a year above the actual range of life which will be shown by the brush treated poles due to the lag in the starting of decay upon untreated poles which has already been referred to. While these figures are only approximate it will be noticed that they indicate a greater addition to the life of poles through treatment for a northern location as compared with a southern location.

Method of Failure of Brush Treatments.—In making inspections of the treated poles special attention was given to determining the cause of the beginning of decay. In some cases decay had extended at the time of inspection to a point which made it impossible to reach a conclusion as to how it began. With only two or three exceptions, however, it has been found that the thin treated layer on the outside of the pole remained sound after decay began. Any parts of the treated layer which covered decay were usually removed in the course of the inspection and the sound condition of the treated wood was readily checked by direct examination. Where a determination as to the point at which decay began was possible it was generally found that the presence of a check, split or other opening in the treated layer afforded a path through which the decay producing organisms could gain access to the underlying untreated timber. From this point of entrance decay would spread usually affecting a thin layer just underneath the treated wood for some distance on either side of the point of entrance.

TABLE XIV—LIFE OF EXPERIMENTAL UNTREATED JUNIPER POLES IN THE SAVANNAH-MELDRIM LINE

Year of inspection	Years of service	Green		Seasoned	
		No. of poles replaced	Total pole years in service	No. of poles replaced	Total pole years in service
1909	4	0	—	1	4
1910	5.5	28	154	38	209
1912	7	23	161	28	196
1913	8.5	24	204	22	187
*1915	10.5	17	178	13	136.5
		92	697	102	732.5
		Average life	7.5 years		7.2 years

*Estimated

TABLE XV.—AVERAGE YEARS TO INITIATION OF DECAY FOR BRUSH TREATED EXPERIMENTAL POLES (OMITTING PRESERVATIVE "F")

(Computed for 100 poles on basis of percentages of sound poles.)

SAVANNAH-MELDRIM LINE.

	Average years sound	Juniper poles Per cent	Juniper poles Total years	Chestnut poles Per cent	Chestnut poles Total years
Poles unsound in 1909	2.	31.7	63.5	25.6	51.5
Poles becoming unsound in 1909-1910	4.8	21.6	104.	18.6	89.0
Poles becoming unsound in 1910-1912	6.2	13.6	84.5	12.4	77.
Poles becoming unsound in 1912-1913	7.8	15.4	120.	4.7	37.0
Poles becoming unsound in 1913-1915*	9.5	17.7	168.	19.3	183.5
Poles becoming unsound in 1915-1917*	11.5	——	——	19.4	223.0
			540.0		661.0
Average per pole		5.4 yrs.		6.6 yrs.	

BUFFALO-WARREN LINE.

	Average years sound	Per cent	Total years
Poles unsound in 1910	2.5	12.4	31
Poles becoming unsound in 1910-1913	6.5	31.4	204
Poles becoming unsound in 1913-1916*	9.5	28.1	267
Poles becoming unsound in 1916-1919*	12.5	28.1	351
Average per pole	8.5 yrs.		853

*Estimated.

Fig. 3, which is an illustration of a brush treated pole in the Buffalo-Warren line, shows excellently the usual conditions attending the starting of decay in brush treated poles. This pole was sound when inspected in 1910 but on inspection in 1913 decay was found extending over the light-colored section shown at the bottom

Fig. 3. From Photograph of Brush Treated Pole, Illustrating the Beginning of Decay.

of the illustration. This section measured about six inches in width and the total depth of the cut was about one-quarter of an inch below the original external surface of the pole. The treated layer on the surface was sound but showed on inspection that there was soft wood beneath. On cutting the treated layer the thin underlying layer of decayed wood was found and removed before the photograph was taken. It will be noticed that there is a check visible in the illustration which passes through the center of the decayed section. This probably afforded the means for decay producing organisms to enter the pole and it will be noted that the decay had progressed about equal distances in either direction around the pole from this check.

The only other type of failure in brush treated poles which has yet been noted was found in two or three specimens during the 1913 inspection of the Buffalo-Warren line. In the case of these few poles the external treated layer had turned soft and punky and could be easily scraped from the pole. The soft wood was collected from these poles and subjected to analysis. The same methods of extraction were used as had previously been applied to creosoted pine poles. It was found that about 5 per cent by weight of oily matter could be extracted from the sample. This oily matter on analysis was found to be practically free from substances distilling below 270 deg. cent. About half of the extract distilled between 270 deg. cent. and 360 deg. cent., at which point the distillation was stopped. The residue was found to be a viscous pitch. The extract was observed to be somewhat contaminated with substances derived from the wood. No definite conclusions can be drawn from this single experience but the evidence gathered suggests that in this case most of the preservative had been removed from the timber before decay started. Decay of this type, however, cannot, on the basis of the data thus far gathered, be regarded as a common cause of the failure of brush treated poles.

Methods of Treatment.—The application of preservative to the brush treated poles was generally made under similar conditions, as the principal object of the work was to determine the efficiency of a method which had already passed through a considerable development. It will be noticed on examining the tables, however, that several of the series of poles treated with particular preservatives were divided between one- and two-coat treatments; and that in the case of one preservative, dead oil of coal tar, three-coat treatments were also experimented with.

The effect of a one-coat treatment is most clearly shown in Table XII covering the Buffalo-Warren line. In this table there are several cases where approximately equal numbers of poles were given one-coat and two-coat treatments with the same preservative. In each case the superior results obtained with the two-coat treatment are obvious. In the Savannah-Meldrim line only a few poles were given one-coat treatments and this was done only because the stock of preservative ran short. Because of the small number of poles receiving the one-coat treatment, the effect of peculiar characteristics in an individual pole is much enhanced so that no definite conclusions can be based upon the results obtained in this line.

The results of the experiments with three-coat treatments will be found in Table X covering the Savannah-Meldrim line. No clear evidence of any advantage derived from applying the third coat is indicated.

With one exception, all of the preservatives were heated before application. Preservative C (see Table X, Savannah-Meldrim line) was applied cold to all except a few of the poles treated with it. The results obtained with the poles treated with cold preservative are only slightly inferior to the results obtained with the poles to which the hot preservative was applied. A somewhat greater amount of the preservative was absorbed when it was heated before application.

Comparison of Preservatives Used.—It will be noticed that none of the seven preservatives experimented with shows consistently superior results to the others. Some of the preservatives have given irregular

results, showing up well with one group in an experimental series and poorly in another. Preservative A and dead oil of coal tar give the most consistent results in the Savannah-Meldrim and the Buffalo-Warren experiments where a number of other preservatives were employed. In the case of the Omaha-Denver line where the other preservatives were not included in the experiment, the relation between the results obtained with these two preservatives is about what was to be expected from them in view of their previous record in the other lines. Except as a preservative contained a large proportion of constituents soluble in water, it would be expected to remain in the ground line section of poles for a number of years as the experience with creosoted pine poles indicates that preservative is lost by evaporation much more slowly from this part of the pole than from the upper sections. As the characteristic type of failure for brush-treated poles has been due to mechanical causes such as the opening of checks or the cutting of the treated layer, it would be expected that the differences between the results obtained with the different preservatives experimented with would not be great, and the summarized data accord fairly well with this expectation.

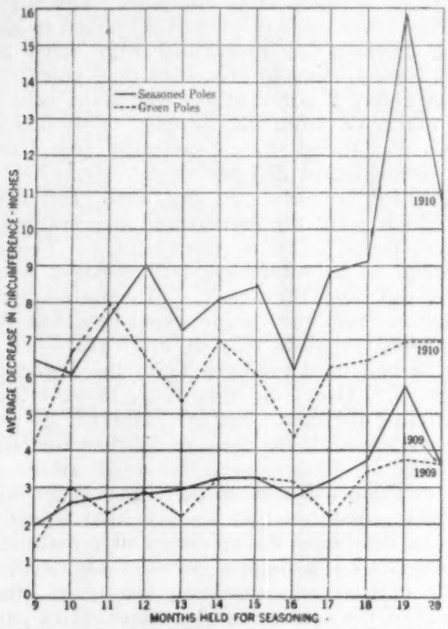


Fig. 4—Comparison of Rate of Decay—Seasoned and Green Juniper Poles. Seasoned poles plotted by sub-groups according to duration of seasoning. Green poles plotted against seasoned poles in same sub-group.

The Effect of Seasoning.—At the time these experiments were started it was generally assumed that seasoning would produce a substantial increase in the life of poles. One thing aimed at in the experiments was to secure a direct demonstration of this generalization. It will be noticed, however, that in the case of the Savannah-Meldrim line appreciably better results are shown by the "green" poles and that in the case of the Buffalo-Warren line the seasoned poles show only a slight advantage over the "green" poles.

In considering these results it must be borne in mind that the conditions of the experiment made it necessary to collect poles each month over a period of about a year and to hold the poles first collected until it was certain that the poles last collected had been thoroughly seasoned. While the poles were skidded and other precautions were taken to keep them in good condition and free from decay, it will be seen that a part of the seasoned poles were held for a period considerably in excess of that normally required for seasoning.

In the Savannah-Meldrim line, poles which received the same amount of seasoning were installed in the same sub-group and consequently in the same section of the line. In Fig. 4 we have plotted the average decrease in circumference for each month's group of seasoned juniper poles, and for comparison with it we have plotted the decrease in circumference for the "green" poles included in the same sub-group with each lot of seasoned poles, and therefore exposed to approximately the same conditions. The data are plotted only for the inspections of 1909 and 1910 as the removals subsequent to 1910 preclude the showing of comparative data. Fig. 5 is a corresponding plot for the chestnut poles in the Savannah-Meldrim line. Fig. 4 shows a strong tendency to an increasing rate of decay for the longer periods of seasoning. In Fig. 5 this tendency is not so marked although there is a slight trend towards a higher rate of decay as the period of seasoning increases.

It was also found that the treated poles in this line which had begun to decay showed distinctly higher rates of decay in the case of poles subjected to the longer periods of seasoning. The indications are, therefore, that the superiority of "green" poles over seasoned poles in the Savannah-Meldrim experiment is, in part at least, due to the excessive duration of the period of seasoning. The conclusion to be drawn from this experience seems to be that seasoning affords at best only a slight increase in the life of poles and that the greatest advantage to be derived from seasoning is that the pole is brought into a condition suitable for receiving a butt treatment.

Insect Damage to Poles.—For many years insects have been found in decaying poles but it is only recently that systematic study of insect damage to poles has been attempted. The study of this problem was proposed in 1910 by Dr. A. D. Hopkins of the Bureau of Entomology, whose assistant, Mr. T. E. Snyder, had just completed the investigation of a case where a wood-boring beetle (parandra brunnea) had been found causing serious injury to a pole line. The inspection of the experiments with butt treated poles was, at that time, just becoming active. Through the participation of Mr. Snyder

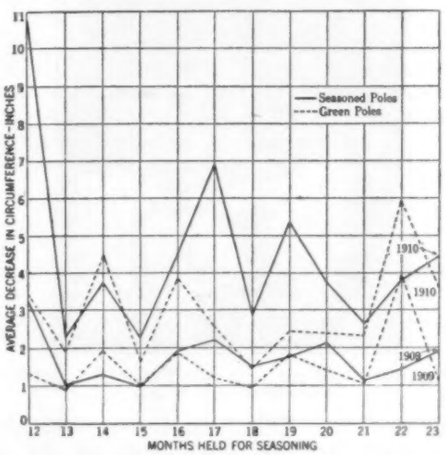


Fig. 5—Comparison of Rates of Decay—Seasoned and Green Untreated Chestnut Poles.
Seasoned poles plotted by sub-groups according to duration of seasoning. Green poles plotted against seasoned poles in same sub-group.

in one of the early inspections, a foundation was laid for future work through the training of the inspection force in methods for gathering data bearing on insect damage. Through following these methods, and with the assistance afforded by the Bureau of Entomology in identifying specimens collected by inspectors, a valuable record of insect damage as affecting the experimental poles has been gathered.

Substantial insect damage has come from two very different sources. Termites, or white ants as they are often referred to colloquially, have long been recognized as a source of injury to timber, particularly in the South, where the warm climate is favorable to their prevalence. The damage caused by the wood-boring larvae of beetles has only recently received recognition. Both of these classes of insect are fairly common causes of damage to pole timber, and data as to the effect upon their incidence of methods of preparing and treating poles are therefore worthy of attention.

TABLE XVI—BUFFALO-WARREN LINE DAMAGE TO POLES BY WOOD BORING INSECTS

Method of preparation applied to poles	No. of poles exposed	No. poles showing decay to 1910	No. poles damaged by wood borers to 1910	No. poles showing decay to 1913	No. poles damaged by wood borers to 1913	No. of poles damaged by wood borers in 1910, showing no new damage in 1913
Green untreated.....	200	200	8	200	16	4
Seasoned untreated.....	350	349	2	350	11	1
Coated with tar.....	48	47	1	48	2	..
Brush Treated—Preservative "F".....	79	59	2	78	3	2
Brush Treated—Preservative "A"	74	10	..	31	1	..
Brush Treated—Preservative "B"	76	11	..	42	1	..

The results of studies of wood-boring larvae (particularly parandra brunnea) have been published by Mr. Snyder. Reference is made to his publications for details concerning their attack on poles. For our purposes it is sufficient to note that once entrance to a pole is obtained, the larvae bore deeply into the heartwood and consequently where their number is large a complete honey combing of the pole cross-section soon results. Wood borers have been found both in the Omaha-Denver line and the Buffalo-Warren line. Data relative to their attack in the first named line are included in Table XIII. Data from the Buffalo-Warren line are summarized in Table XVI.

It will be noticed that in the Buffalo-Warren line the damage from wood-boring larvae has been almost wholly confined to the two untreated groups of poles. The two treated poles yielding evidence of damage in 1910 were members of the group showing the highest proportion of unsound poles. Of the three treated poles first showing signs of damage in 1913, two had been noted as unsound in the previous inspection. Larvae were found in eight poles in 1910. Two of the eight poles in which larvae were found in 1910 were free from signs of wood-boring larvae in 1913. In these two poles, the presence of only one or two larvae was reported in 1910. It seems probable that the cleaning applied to the poles in connection with the inspection caused the removal of the few larvae then present.

The data given in Table XIII for the Omaha-Denver line represent the results of the first inspection for condition. Large percentages of both treated and untreated poles were found to be attacked by wood-boring larvae. The percentage of brush treated poles attacked to the total brush treated poles installed is a little lower than the percentage of untreated poles attacked to untreated poles installed. The percentage of poles attacked to poles showing decay is, however, higher for the brush-treated poles than for the untreated poles.

Experience with wood-boring larvae has not yet been extensive enough to establish definite conclusions as to methods of inhibiting their attack. The indications are, however, that the beetles will not deposit eggs on poles unless they can find a soft or decayed spot, so that as long as a treatment remains effective it should be counted upon to prevent damage from wood-boring insects.

The principal insect damage found upon the poles placed in the Savannah-Meldrim line was due to termites. A few cases of attack by termites were also noticed when the Omaha-Denver line was examined. Termites do not like direct sunlight and in attacking poles consequently begin to cut their galleries a little below the outer surface of the timber. A few cases have been noticed where outside galleries of cemented sand have been built across sections of the pole surface where for some reason the wood was not attacked. In a number of cases where a pole was badly infested by termites, small numbers and a slight attack were noticed at adjacent poles, suggesting that the large colony gathered about the heavily attacked pole may have extended its sphere of influence to neighboring poles.

No cases were noticed of termite attack upon the thin outside layer of brush treated poles in which the preservative is located. The tendency of the insect to avoid the light, however, would result in leaving untouched a surface layer of wood of approximately the thickness of the treated layer. In a number of cases termites were found in small decayed spots where the initial failure of a brush treated pole had taken place. The relation of these spots to small checks and other openings in the treated layer has already been discussed. No direct evidence was obtainable as to whether the decay-producing organism or the termites first entered such poles.

The summarized results of the first two inspections of the Savannah-Meldrim line show that 38 per cent of the unsound treated poles bore evidence of the attack of termites, while 37 per cent of the untreated poles gave evidence of such attack. Owing to the substantial reconstruction of untreated poles which followed the 1910 inspection this statistical comparison cannot be continued for the following years. The equality in the percentages of decayed untreated poles and decayed treated poles which were infested by termites suggests, however, that termites follow the decay. In support of this conclusion it is also to be noted that there were a number of cases where sound brush treated poles were located between two untreated poles, both of which were badly infested by termites. The indications are, therefore, that treatment retards the attack of termites, and that the retardation is probably due to delaying the beginning of decay.

Some instances, however, of termites attacking treated wood were noticed in the inspection of the whole length treated pine poles in the Montgomery-New Orleans line. This attack came after the poles had been exposed to the action of the weather for many years and suggests that ultimately changes may occur in treated wood which permit termites to work upon it. With

brush treatments, however, which give only light penetrations, the available information indicates that in the average case deterioration will set in much earlier than it does with the heavier treatments. The evidence just cited indicates that brush treatments may have a direct effect in preventing the attack of termites. The heavier treatments would, of course, produce the same effect as the brush treatment, but may lose their power of inhibiting termite attack before the power to inhibit decay is gone.

CONCLUSION

Because of the present incomplete stage of our experience with the different types of treatment described, conclusions can be reached for only a part of the problems whose solution was sought. The seasoning of poles offers at best only moderate advantages in the way of increased life. Its greatest value is as a preparation for the successful application of preservatives. The practice of applying to poles preservatives high in antiseptic power and insoluble in water has been shown to yield increased life. The amount of preservative applied and the depth to which it is made to penetrate appear to exercise controlling influences upon the results obtained. Mechanical failure of the treated layer is indicated as the principal limit to the effectiveness of light applications of preservatives.

In closing we wish to acknowledge our indebtedness to Mr. E. B. Griffen, for his assistance in carrying out the work of inspection and analyzing the data obtained; and to Mr. C. C. Fritz and Mr. H. D. Cutler, who have also assisted in obtaining the data on which our contribution is based. For careful attention to the analyses and other chemical work connected with the studies of treated poles we are indebted to Mr. G. O. Bassett and Mr. H. G. Walker. We also gratefully acknowledge our indebtedness to many past and present members of the Forest Service and to the representatives of the Bureau of Entomology who have taken part in the experiments with treated poles.

APPENDIX B—ANALYSES OF PRESERVATIVES.

WHOLE LENGTH TREATMENTS

Numerous analyses of dead oil of coal tar supplied for the whole length treatments were made in the case of both groups of poles under observation. As it is not possible to indicate any relation between the dead oil of coal tar covered by a specific analysis and any particular pole installed, only averages of all of the analyses made are given.

Washington Norfolk line. Twenty-eight analyses were made of the dead oil supplied for treating poles used in this line. The average of the results of these analyses is as follows:

Distillates.

Loss—water, etc., to 170 deg. cent.	1 per cent.
170 deg. cent. to 205 deg. cent.	2 per cent.
205 deg. cent to 210 deg. cent.	4 per cent.
210 deg. cent. to 235 deg. cent.	45 per cent.
235 deg. cent. to 240 deg. cent.	7 per cent.
240 deg. cent. to 270 deg. cent.	16 per cent.
270 deg. cent. to 316 deg. cent.	9 per cent.
Residue above 316 deg. cent.	16 per cent.
Naphthalene 205 deg. cent. to 235 deg. cent.	49 per cent.
Oil not distilling below 270 deg. cent.	25 per cent.
Specific gravity	1.022
Melting point	36 deg. cent.
Boiling point	70 deg. cent.

Montgomery-New Orleans line. Thirty-eight analyses were made of the dead oil supplied for treating poles used in this line. The average of the results of these analyses is as follows:

Distillates.

Loss—water, etc., to 170 deg. cent.	6.0 per cent.
170 deg. cent. to 205 deg. cent.	4.0 per cent.
205 deg. cent. to 210 deg. cent.	4.0 per cent.
210 deg. cent. to 235 deg. cent.	46.0 per cent.
235 deg. cent to 240 deg. cent.	5.0 per cent.
240 deg. cent. to 270 deg. cent.	13.0 per cent.
270 deg. cent. to 316 deg. cent.	6.0 per cent.
Residue above 316 deg. cent.	16.0 per cent.
Naphthalene 205 deg. cent. to 235 deg. cent.	50.0 per cent.
Oil not distilling below 270 deg. cent.	22.0 per cent.
Specific gravity	1.03
Melting point	38 deg. cent.
Boiling point	107 deg. cent.

Butt Treatments.

Most of the detailed analyses of the preservatives used for brush treatment were made on samples representing material applied to poles placed in the Savannah-Meldrim line. There is no reason for believing, however, that the composition of the preservatives supplied for the Buffalo-Warren line differed appreciably from that of the analyzed samples.

Savannah-Meldrim line.

Preservative A.

	Series I.	Series II.
Specific gravity at 17 deg. cent.	1.121	1.122
Flashing point	137 deg. cent.	137 deg. cent.
Burning point	164 deg. cent.	168 deg. cent.
Distillates:		
Loss	0.19 per cent.	0.22 per cent.
Below 235 deg. cent.	0.41 per cent.	0.61 per cent.
From 235 deg. cent to 315 deg. cent.	29.16 per cent.	26.97 per cent.
Residue above 315 deg. cent.	70.24 per cent.	72.20 per cent.
Solids, 1.7 deg. to 4.4 deg. cent.	No separation.	No separation.
Tar acids	1.12 per cent.	1.16 per cent.
Mineral matter	0.16 per cent.	0.05 per cent.

Preservative B.

	Series I.	Series II.
Specific gravity at 17 deg. cent.	1.134	1.134
Flashing point	135 deg. cent.	135 deg. cent.
Burning point	163 deg. cent.	162 deg. cent.
Distillates:		
Loss	0.13 per cent.	0.19 per cent.
Below 235 deg. cent.	0.35 per cent.	0.31 per cent.
From 235 deg. cent. to 315 deg. cent.	28.84 per cent.	30.10 per cent.
Residue over 315 deg. cent.	70.68 per cent.	69.40 per cent.
Solids, 1.7 deg. cent. to 4.4 deg. cent.	No separation.	No separation.
Tar acids	1.30 per cent.	1.30 per cent.
Mineral matter	0.31 per cent.	0.47 per cent.

Preservative C.

	Series I.	Series II.
Specific gravity at 17 deg. cent.	1.032	1.031
Flashing point	90 deg. cent.	90 deg. cent.
Burning point	99 deg. cent.	101 deg. cent.
Distillates:		
Loss	0.65 per cent.	0.53 per cent.
Below 235 deg. cent.	15.14 per cent.	14.97 per cent.
From 235 deg. cent. to 315 deg. cent.	26.23 per cent.	25.60 per cent.
Residue above 315 deg. cent.	57.98 per cent.	58.90 per cent.
Solids, 1.7 deg. cent to 4.4 deg. cent.	No separation.	No separation.
Tar acids	15.4 per cent.	0.02 per cent.
Mineral matter	0.14 per cent.	16.3 per cent.

Preservative E.

	Series I.	Series II.
Specific gravity at 17 deg. cent.	1.035	1.035
Flashing point	115 deg. cent.	111 deg. cent.
Burning point	129 deg. cent.	123 deg. cent.
Distillates:		
Loss	0.29 per cent.	0.51 per cent.
Below 235 deg. cent.	2.51 per cent.	3.65 per cent.
From 235 deg. cent. to 315 deg. cent.	26.00 per cent.	24.74 per cent.
Residue at 315 deg. cent.	71.20 per cent.	71.10 per cent.
Solids, 1.7 deg. cent to 4.4 deg. cent.	No separation.	No separation.
Tar acids	13.7 per cent.	11.8 per cent.
Mineral matter	0.04 per cent.	None.

Preservative F.

	Series I.	Series II.
Specific gravity at 38 deg. cent.	1.007	1.005
Distillates:		
Below 170 deg. cent.	26.66 per cent.	96.90 per cent.
From 170 deg. cent to 205 deg. cent.	17.39 per cent.	0.10 per cent.
From 205 deg. cent to 210 deg. cent.	9.27 per cent.	0.00 per cent.
From 210 deg. cent. to 235 deg. cent.	25.92 per cent.	0.00 per cent.
From 235 deg. cent. to 240 deg. cent. / From 240 deg. cent. to 270 deg. cent. / From 270 deg. cent. to 300 deg. cent.	15.98 per cent.	0.15 per cent.
Above 300 deg. cent.	4.24 per cent.	0.85 per cent.
Loss	0.54 per cent.	2.00 per cent.
Total	100.00 per cent.	100.00 per cent.
Naphthalene	35.19 per cent.	None.
Water	20. per cent.	90. per cent.
Tar acids	19. per cent.	1. per cent.
Note	Sticks and other foreign matter present.	Sticks, sand, and other foreign matter present.

Dead Oil of Coal Tar.

	Series I.	Series II.
Specific gravity at 38 deg. cent.	1.035	1.035
Distillates:		
Below 170 deg. cent.	0.17 per cent.	0.09 per cent.
From 170 deg. cent. to 205 deg. cent.	1.25 per cent.	0.70 per cent.
From 205 deg. cent. to 210 deg. cent.	1.14 per cent.	0.74 per cent.
From 210 deg. cent. to 235 deg. cent.	43.96 per cent.	45.92 per cent.
From 235 deg. cent. to 240 deg. cent.	6.66 per cent.	6.12 per cent.
From 240 deg. cent. to 270 deg. cent.	19.48 per cent.	20.03 per cent.
From 270 deg. cent. to 300 deg. cent.	10.07 per cent.	9.61 per cent.
Residue above 300 deg. cent.	17.00 per cent.	16.30 per cent.
Loss	0.27 per cent.	0.49 per cent.
Total	100.00 per cent.	100.00 per cent.

Naphthalene	45.10 per cent.	46.66 per cent.
Liquid at	38 deg. cent.	38 deg. cent.
Tar acids	9. per cent.	8.3 per cent.
Water	None.	None.

Buffalo-Warren line.

Dead Oil of Coal Tar used in Butt Treatment Tanks, Mt. Arlington, N. J. Sample represents oil in the tank during third run, June 17, 1905.

Specific gravity at 32 deg. cent	1.018
Condition at 38 deg. cent	Liquid

Fractionation.

Fraction No. 1 to 170 deg. cent	0.09 per cent.
Fraction No. 2 170 deg. cent.-205 deg. cent	1.00 per cent.
Fraction No. 3 205 deg. cent.-210 deg. cent	1.19 per cent.
Fraction No. 4 210 deg. cent.-235 deg. cent	34.99 per cent.
Fraction No. 5 235 deg. cent.-240 deg. cent	7.57 per cent.
Fraction No. 6 240 deg. cent.-270 deg. cent	23.48 per cent.
Fraction No. 7 270 deg. cent.-300 deg. cent	11.50 per cent.
Fraction No. 8 Residue above 300 deg. cent	19.78 per cent.
Total per cent	99.60 per cent.
Loss per cent	0.40 per cent.
Naphthalene	36.18 per cent.
Oil not distilling below 270 deg. cent	31.28 per cent.
Water	None
Tar acids	4.8 per cent.

Omaha-Denver line.

Dead Oil of Coal Tar used at Escanaba, Mich.

Condition of oil at 38 deg. cent	Solids Separate
Liquid at 42 deg. cent. Specific gravity at 42 deg. cent	1.028

Fractionation.

1. to 170 deg. cent	None
2. 170 deg. cent. to 205 deg. cent	None
3. 205 deg. cent. to 210 deg. cent	0.81 per cent.
4. 210 deg. cent. to 235 deg. cent	56.80 per cent.
5. 235 deg. cent. to 240 deg. cent	5.88 per cent.
6. 240 deg. cent. to 270 deg. cent	15.78 per cent.
7. 270 deg. cent. to 300 deg. cent	7.32 per cent.
Residue above 300 deg. cent	13.10 per cent.
Total per cent	99.69 per cent.
Loss per cent	0.31 per cent.
Water	None
Naphthalene	57.61 per cent.
Tar acids	10.7 per cent.

Dead Oil of Coal Tar Used for Brush Treatments in Nebraska.

1. Sp. gr.	1.056
2. Fluidity	Liquid at 38 deg. cent.
3. Distillation of 100-gm. sample	
(a) 0-205	None
(b) 205-235	11.39 per cent.
(c) 0-315	79.68 per cent.
(d) Residue above 315	Soft and plastic
(e) Water	None.
Tar acids	3.00 per cent.
Sulphonation residue	None
Flash point	98 deg. cent.
Burning point	106 deg. cent.

Preservative A (Used for Brush Treatments in Nebraska).

(a) Spec. gravity	1.11
(b) Flashing point	138 deg. cent.
(c) Burning point	176 deg. cent.
Fractional distillation:	
Distillate up to 235 deg. cent	1.28 per cent.
Distillate between 235 deg. and 300 deg. cent	3.16 per cent.
Residue above 300 deg. cent	95.5 per cent.
Fluidity	Fluid at 38 deg. cent.
Tar acids	0.1 per cent.
Ash	0.12 per cent.

Record in Wire Stringing

W. T. Summers, general foreman of the construction crew of the United Telephone Company, Salina, Kas., established a new record in line building when the telephone line to Lincoln was completed. The entire line to Lincoln was finished in five hours, or the line was strung on the poles at the rate of six miles an hour. The line is built along the Salina Northern tracks to Lincoln and the railroad furnished an engine and a flatcar for the work. The wire was laid on the flatcar and unrolled from the car direct to the poles.

D. A. Van Trine, general superintendent of the company, said it was a very unusual thing to use the railroad in that way and that the Salina company had never done it but once before.

Sale of Chicago Independent Endorsed

Sale of the automatic telephone property of the Chicago Tunnel Company to the Chicago Telephone Company and the American Telephone and Telegraph Company is authorized by the Illinois public utilities commission under conditions which officials connected with the Chicago Telephone Company say will no doubt prove acceptable.

Throughout the controversy before the commission the principal mooted question has been what rights the Independents who use the automatic lines in and out of the city should enjoy. The Chicago Telephone Company took the position that it should preserve the Independents' rights only to the same extent as the service they now enjoy. As the automatic properties are to be dismantled and salvaged, it contended, that this should be the extent of requirements placed on it.

The commission ruled practically as the Chicago Telephone Company has held—that the Independents are to be give the same facilities for connections they now have, but not stipulating any further enlargement of service. The companies involved are given thirty days in which to file acceptances.

The financial features of the sale as authorized by the commission are, in substance, as follows:

That the price to be paid shall not exceed $5,536,192, of which the Chicago Telephone Company is to pay $3,236,192 and the American Telephone and Telegraph Company $2,300,000.

The Chicago Telephone Company is to sell that part of the property which is not usable to the American Telephone and Telegraph Company for $704,134 in cash.

The Chicago Telephone Company cannot charge to capital account more than $1,532,058, which has been found to be the value of the property to be acquired, of which amount $438,639 is fixed as the value of tunnel rights. The sum fixed as the value of the tunnel rights must be amortized in equal yearly amounts out of operating expenses and entirely eliminated from the capital account by February 19, 1929, the date of the expiration of the ordinances of the tunnel company.

Any sum over $1,532,058 paid by the Chicago Telephone Company must be charged to its corporate surplus account and shall not be capitalized. The same condition attaches to the payment of $2,300,000 by the American Telephone and Telegraph Company, and in addition, the latter company is prohibited from making any collection from the Chicago Telephone Company or from capitalizing the amount.

The Chicago Tunnel Company is to pay the city $500,000 for the privileges granted in the ordinance of March 11, 1916.

The council approved the sale a few months ago, a minority opposing it. The city was a beneficiary in the transaction to the extent of $500,000, foregoing its right under the ordinance to foreclose on the property after the automatic company admitted that its bona fide number of subscribers was less than 20,000, or less than the required number.

Independent Purchase Beneficial

Subscribers of Independent telephone companies in Grand Rapids and the balance of the state are greatly interested in the purchase by the United Home Telephone Company (Independent) of the lines of the Michigan State Telephone Company in Muskegon, Oceana, Mason, Lake and Newaygo counties. The United Home Telephone Company will operate without competition at Muskegon, Ludington, Hart, Shelby, Pentwater, Whitehall, Montague, Holton, Hesperia, Walkerville, Ravenna, Conklin, Coopersville and other places in the above named counties. Subscribers of the Citizens Telephone Company and other Independent companies will be able to reach the above places. Grand Haven and Manistee will also be reached by the change.

Pittsburgh Rates Examined

An inquiry into telephone rate conditions in Pittsburgh was launched recently when a special committee to conduct the investigation was named at a meeting of the members' council of the Pittsburgh Commercial Club, John F. Lent, president. The committee includes Joseph T. Horner, chairman; Frank B. Williams, E. E. C. Corrigan, W. O. Harrison and Dr. C. E. McKee.

Public Utility Commission News

Reports Concerning the Activities of State Regulating Bodies in the Telephone Field

Illinois

THE state public utilities commission June 3 entered an order dismissing, on motion of petitioner, the case of the Interstate Telephone and Telegraph Company against the Carroll County Telephone Company of Savanna; complaint of rates charged by the Carroll County Company from Milledgeville to Coleta, Morrison, Prophetstown and Sterling, and from Chadwick to Coleta, Morrison, Prophetstown and Sterling.

The commission also entered an order dismissing, on motion of petitioner, the complaint of the Interstate Telephone and Telegraph Company against the Polo Mutual Telephone Company as to rates charged by the Polo company from Polo to Prophetstown and Sterling.

Maryland

A readjustment of the telephone service schedule for Baltimore and the State was proposed by the Chesapeake and Potomac Telephone Company at a conference with the public service commissioners and Assistant General Counsel Osborne I. Yellott.

Up to the time of adjournment only the city and suburbs had been touched upon. The State will be taken up later.

The most important changes proposed by the telephone company are as follows:

That the flat "P. B. X.," or branch exchange charge, be cut from $30 a year to $24.

Under the present schedule "P. B. X." customers who use 8,400 calls a year or more pay 2 cents a call, and those using 3,000 calls or more pay 3 cents a call.

It is proposed to split this rate and have a flat charge of 2½ cents a call up to 2,400 and 2 cents for excess calls.

On other than "P. B. X." phones the charge in the city will remain the same, but the subscribers will be given a more extended service with the suburbs without additional charge.

In the suburban section it is proposed to extend the city-rate area for a mile and a half all around the present boundaries of the city, covering about the same territory as was included in the annexation plan. In this section all mileage charges will be done away with. The regular city rate of $48 a year will apply, but on this rate the suburban subscriber will have the use of both the suburban and city exchanges without extra charge.

If the subscriber does not desire to take this rate he may remain on the old basis, but will have the added advantage that incoming calls to his phone from the city will not have any extra charge attached.

Only the outlines of the plan was gone over with the commissioners today, and these left the company about $16,000 loser by the new schedule, but it is expected that this will be adjusted by other changes yet to be proposed and that the total revenue of the company will in the end remain about the same as it is now.

Attorney Robert V. Marye represented the Chesapeake and Potomac Telephone Company.

Massachusetts

The Massachusetts Public Service Commission has ordered the suspension of the proposed withdrawal and cancellation of second party use of service on unlimited service by the New England Telephone & Telegraph Company, until August 1, 1916. The company proposed to put it in effect June 1. A hearing will probably be held sometime soon.

Missouri

The following are the revised telephone rates, effective July 1, 1916, Public Service Commission Missouri Rate schedule No. 2, first revised, for Skidmore:

Inside the initial rate area, on special line, $1.00 per month, $12.00 per year.

Inside the initial rate area, on party line, 75c per month, $9.00 per year.

Outside the initial rate area, on party line, $1.25 per month, $15.00 per year.

To all parties, both inside and outside the initial rate area, desiring service, who don't want a telephone installed, a pay station fee of 75c per month or $9.00 per year will be charged.

Message rate service for non-subscribers over the company's toll or commercial lines shall be 15c for each message of five minutes duration. To all parties desiring private line service outside the initial rate area, where the company builds and maintains all equipment for same, a charge of seven dollars ($7.00) per mile or fraction thereof will be charged annually in addition to the regular monthly rate.

To all parties desiring private line service and who shall furnish and maintain all equipment for same to the corporate limits of the city of Skidmore, Missouri, only the regular monthly rental for rural service shall be charged.

There shall be a charge of 25c per hour and the necessary cost of material and livery to make a change in the location or type of equipment.

Charges are due and payable inside the initial rate area at the end of each month. Outside the initial rate area quarterly in advance.

Nebraska

The state railway commission declined on June 1 to enjoin the Lincoln Telephone and Telegraph company from removing farm line telephones near Fairbury, where subscribers refuse to pay the $1.50 rate. The patrons insist on paying the old rate of $1.25 a month in vogue before the Fairbury company was taken over by the Lincoln concern.

The Chester Telephone Company has asked the railway commission if the Burlington railroad had any right to charge the telephone company $1 for crossing the railroad crossing at a public highway. The commission has replied by saying the railroad company cannot in such cases charge the telephone company anything.

Although it got just what it asked for at the hands of the state railway commission, the Cedar County Tele-

phone company is not satisfied and now wants a new order which will raise rates on residence telephones at Hartington and Fordyce, as well as on business and farm phones. Its manager, J. D. Clair Smith, has asked that the order of May 15 be suspended until a hearing can be had and a decision rendered on the new application. The company got into trouble when it filed its original application, as its franchise at Hartington limits the rates there and much opposition was manifested to the proposal for an increase. On this account, the company amended its request so as to leave residence rates unchanged. The order of the railway commission granted an increase of 25 cents per month for business and farm telephones, as asked by the company. Manager Smith now writes that the company has been having all kinds of trouble because a majority of its stockholders are farmers and are indignant because they were raised while the city residence patrons were not. The commission has accordingly set a new hearing for June 29. It is understood that the people at Hartington and Fordyce will register a kick on the proposal to raise their rates. The company, however, says it must have $1,200 a year of additional revenue to take care of improvements that are being made in the service. Mr. Taylor, a member of the commission, was at Albion on June 26 to hear the Monroe Telephone company's application for an increase of telephone rates at Albion and for permission to issue $50,000 of stock in payment for the exchange it is taking over.

New Jersey

There will be no special investigation of the rates of the New York Telephone Company in the city of Bayonne at this time, according to the Board of Public Utility Commissioners, but this question will be taken up in the general investigation of the rates charged by this company throughout the state, which probe is to be conducted in the very near future by the Board.

The Board, therefore, has dismissed, without prejudice, the complaint filed with it by W. D. Salter, of Bayonne. He claimed that the company charged him more for an office telephone than the rate fixed in an ordinance of Bayonne Council granting the franchise. The complaint was subsequently joined in by the city and it was further alleged that the rate between Bayonne and New York was excessive and discriminatory.

The company, after an investigation, reduced the rate for service between New York and Bayonne, thereby meeting the city's complaint. The Board pointed out that the Salter complaint was one of general interest and it would be inadvisable to determine it and foreclose many subscribers and municipalities from being heard upon the question in advance of a determination.

New York

A decision in the matter of the Woodruff Hotel Company against the New York Telephone Company, which was started away back in March, 1912, which involved the telephonic connections in the annex to the Woodruff, has just been decided by the public service commission. During this long period the annex, or the rooms therein, have been connected by telephone under an order of the public service commission of June 10. The company refused to install telephones in 26 rooms in the annex at the old rate, or the rate charged for telephones in the rooms of the hotel proper and thereupon cancelled its contract with the hotel company to furnish any telephones in the hotel, except that it offered to furnish telephones at an increase of 300 per cent. The hotel company had the telephone company install the wiring in the hotel but had paid for the same, the hotel company owning the wires, etc. The telephone company maintained that it did not have to furnish service unless it owned the wires.

The public service commission holds that the service must be continued but that the telephone company can have access to the wires at all times. This the hotel company was willing that it should and so stipulated, or offered to stipulate on the hearing in this city several years ago. The rates for the service are to be determined from schedules on file with the commission. There will be an advance from the old rates but how much is not yet known.

Pitcher & O'Brien represented the hotel company.

Ohio

In the matter of the joint application of the Central District Telephone Company, the Washington Telephone Company, the Jefferson Telephone Company, the Belmont Telephone Company, the Union Telephone Company and the Woodsfield Telephone Company for the consent and approval of the commission to the sale of the property of the Washington Telephone Company, the Jefferson Telephone Company, the Belmont Telephone Company, the Union Telephone Company and the Woodsfield Telephone Company to the Central District Telephone Company.

This matter coming on the day set for consideration upon the application herein, and the commission coming now to value the property, used and useful for the service and convenience of the public, of said the Washington Telephone Company, the Jefferson Telephone Company, the Belmont Telephone Company, the Union Telephone Company and the Woodsfield Telephone Company and the property of the Central District Telephone Company within the territory now occupied by said five named companies aforesaid, and after considering the inventories and valuations of said properties submitted by applicants, the independent inventories and valuations made by the commission, the evidence and exhibits, and being fully advised in the premises, the commission finds and ascertains the value of the several classes and kinds of property of the Washington Telephone Company, the Jefferson Telephone Company, the Belmont Telephone Company, the Union Telephone Company and the Woodsfield Telephone Company and the property of said the Central District Telephone Company within the territory now occupied by said aforenamed five companies, and the property of said utilities as a whole, used and useful for the service and convenience of the public in furnishing telephone service in the territory now occupied by said the Washington Telephone Company, the Jefferson Telephone Company, the Belmont Telephone Company, the Union Telephone Company and the Woodsfield Telephone Company as of April 30, 1915, to be as set forth in the following summary, namely:

It is, therefore,

ORDERED, That notice of such valuation placed upon the several kinds and classes of property of said the Washington Telephone Company, the Jefferson Telephone Company, the Belmont Telephone Company, the Union Telephone Company and the Woodsfield Telephone Company, and of the Central District Telephone Company within the territory occupied by said first-named five companies, and upon said property as a whole, as herein summarized and set forth, be transmitted by registered letter to said utilities and to the mayors of the following municipalities, St. Clairsville, Barnesville, Mingo Junction, Antioch, Miltonburg, New Meatamoras, Stafford, Woodsfield, Lewisville, Martins Ferry, Bellaire, Steubenville, Marietta, Fairview, Morristown and Bridgeport; all as provided for under Section

449-12, of the General Code of Ohio. And it is therefore further

ORDERED, That all inventories, valuations, transcripts and exhibits be filed and considered as a part of the record herein. It is further

ORDERED, That the Commission reserve the right, in the event it shall determine the aforesaid inventory to be incomplete or inaccurate, or that said valuation is incorrect, to make such changes therein as may be necessary before said tentative valuation shall become final.

Oregon

Switching charges were awarded the McMinnville Local & Long Distance Telephone Company against the Pacific Telephone & Telegraph Company, the Lafayette Telephone Company, the Amity Mutual Telephone Company, the Yamhill County Mutual Telephone Company, the Sheridan Mutual Telephone Company, and the Yamhill Mutual Telephone Company, in an order issued June 10 by the public service commission. The commission also slightly reduced the McMinnville company's charges for services rendered patrons in McMinnville.

Alleging that it was switching without charge all calls received from or destined for points served by the lines of the foregoing companies, when such calls were destined to or originated with its subscribers, the McMinnville company asked the commission to fix a rate for the service. Between McMinnville, Amity, Carlton, Dayton, Lafayette, Sheridan and Yamhill the commission fixed a charge of 5 cents for the first five minutes, and the same charge for each additional three minutes; between Amity and Carlton, Dayton, Lafayette, Sheridan and Yamhill it fixed a charge of 10 cents for the first five minutes, and 5 cents for each additional three minutes; the same toll was fixed between Dayton and Lafayette, Sheridan and Yamhill; between Lafayette and Sheridan and Yamhill, and also between Sheridan and Yamhill. Between Carlton and Dayton, Lafayette and Sheridan a like rate also prevails, but between Carlton and Yamhill a rate of 5 cents for the first five minutes and 5 cents for each additional three is to be charged. The McMinnville company's tolls for business, one-party line, business two-party line, and residence one-party line were reduced 25 cents each per month.

Wisconsin

On complaint of the Wisconsin railroad commission, Attorney General Walter C. Owen has started an action to recover $150,000 in penalties from the Door County Telephone Company for alleged violation of an order of the commission. The papers in the suit have been filed by Deputy Attorney General Walter Drew who will direct the action. Fifteen specific counts for violations are made against the company. In each the maximum penalty of $10,000 each is asked. The first cause alleges that the company failed to establish full metallic circuits as ordered; the second, that it failed to divide its toll line as ordered; the third that it failed to keep a record of all irregularities regarding service; the fourth that it failed to establish a switch board at Bailey's Harbor as ordered; the fifth and subsequent causes to and including the fifteenth, that it failed to make monthly reports to the commission regarding the progress of construction and work done. Just recently in a similar action the state recovered $10,000 from the Milwaukee Electric Railway & Light company for failure to obey certain service orders of the commission.

An order was issued June 13, by the railroad commission authorizing the People's Telephone Company, of Mt. Hope, to discontinue its present rate of $8 per year per telephone and substitute therefor the rate of $10 per year.

The railroad commission on June 14, issued an order requiring the Denmark Farmers' and Merchants' Telephone company and the Brown County Telephone company to connect its exchanges at Denmark. The commission dismissed the petition of the city of Lancaster for an order requiring the Wisconsin Telephone company and the Farmers' Telephone company to furnish free connections.

The Wisconsin Telephone company filed on June 3 with the railroad commission an amended schedule of rates for its Ashland exchange. The one-party business rate is reduced from $48 to $42 per year, the two-party business rate from $36 to $30 and the rate for trunk lines for private branch exchanges from $36 to $30 per year.

The railroad rate commission of Wisconsin has authorized an increase in the rental of telephone rates of the Allenton-Kohlsville Telephone Company in the territory around West Bend. Beginning July 1, 1916, the charge for rural party line service will be increased from $1.00 to $1.25 per month. Single party business telephone rentals will be increased from $1.50 to $1.75 per month.

Interstate Commission Demands Are Expensive

Telephone companies all over the United States will protest the jurisdiction of the Interstate Commerce Commission and particularly the numerous reports, audits and the like which are demanded of them, if the action of district meetings of the Ohio Independent Telephone Association is carried to its intended conclusion.

The work and expense of these numerous accountings falls with almost equal weight upon the large and small companies. This cost, in some manner, must find its way back to the subscriber.

The telephone companies are not protesting against supervision, but they claim that the reports demanded serve no real purpose.

The telephone men contend that the filing of a report is not necessary, and are of the opinion that the records turned in are given but little consideration.

Telephone Men Ready for War

At the annual meeting of the Boston Plant Chapter of the Telephone and Telegraph Society of New England, held in Boston, May 25, Vice-President E. K. Hall of the New England Telephone and Telegraph Company, said that the companies "are prepared at the drop of the hat to keep armies in the field, forts and ships at sea in communication with headquarters and with one another at all times." About 600 were present. The following new officers were elected: President, John J. McGowan, vice-president, DeWitt S. Adler; secretary, Gordon S. Wallace; treasurer, William J. Hadley.

C.

The use of zinc wire in Germany is a subject of much discussion at present in the electrical periodicals of Germany, due to the increasing scarcity of copper and because iron wires are not always satisfactory. Considering the conductivity of copper to be 100 per cent, that of aluminum is 58.4, that of zinc is 28.5, while that of iron is 12.5. Rules are given on the use of zinc wires in house installations and on the use of zinc cables and zinc bus bars, in the German periodicals devoted to the electrical trade.

Of Interest to the Trade

What the Telephone and Accessory Manufacturers Are Doing to Advance the Art

Union Telephone Companys' Owosso Exchange

The thriving and beautiful city of Owosso, Michigan, had its beginnings in an old Indian trading post, from whence came its name. Could the first inhabitants revisit the scenes of their pioneer existence, probably to them the most wonderful thing about the city's present activity would be its telephone service, for Owosso not only boasts of a telephone service the peer of the best in the world, but it has a telephone building and plant that is a model of its kind.

The growth of this exchange, the principal plant of the Union Telephone Company, has been markedly successful under the management of W. J. Melchers. There are today 48 Kellogg-equipped exchanges in the Union Telephone Company's system, from the universal switchboard at Owosso with a present installation of 413 common battery telephones, 827 magneto city subscribers and 551 rural sets, to its smallest magneto board. As Mr. Melchers says: "There is not a drop in our system but Kellogg and every telephone in each exchange is Kellogg." This is said to be significant when the extraordinary success of the company is considered.

While each of the 47 magneto exchanges owned and operated by the Union Telephone Company is typical of the high class modern Independent magneto exchanges, perhaps the most interesting installation is the Kellogg universal board at Owosso.

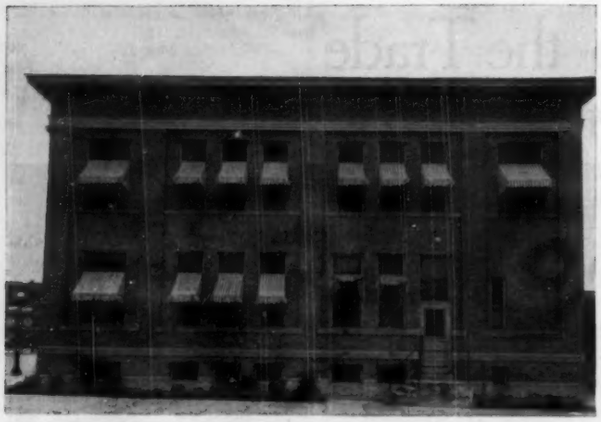
The Rest Room Is Light, Airy and Comfortable.

This equipment was installed in March, 1913, with an initial capacity of 3,200 lines. Its equipment at that time was 980 universal lines. There were, in addition, a modern wire chief's desk and a chief operator's desk, a terminal and arrester rack, mercury arc rectifier, two sets of storage batteries and two sets of pole changers.

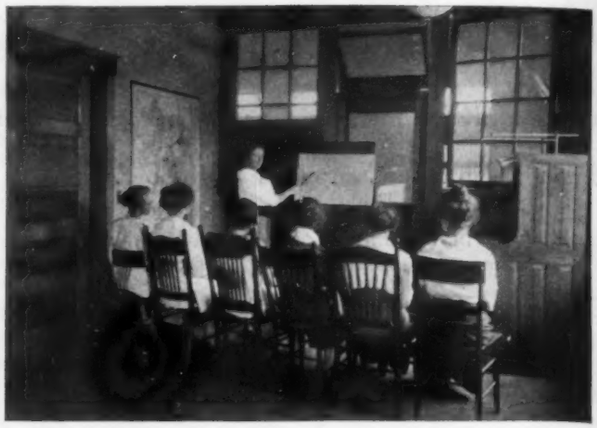
The switchboard is a three-section, steel frame, quarter-sawed oak cabinet, with a capacity of nine operators' positions, seven positions being installed at the time of the cut-over.

This switchboard has enabled the Union Telephone Company to give an exceptional range of service in Owosso. It enabled it to offer at once the more

The Kellogg Universal Switchboard in the Owosso, Michigan, Exchange, of the Union Telephone Company.—Toll Board in Background.



The Owosso Exchange Building of Union Telephone Company.



Operators Receive Great Benefit From the School.

desirable common battery service at higher rate, without any hazardous general rate-raising. In three years of service, it has enabled the company to gradually convert the exchange from magneto service to common battery, without trouble or complication, while giving the highest class magneto service.

The operators handle a great many lines without difficulty and are much pleased with the simple yet reliable operating of the universal switchboard. Fewer operators give better service, it is claimed, with the Kellogg universal than with the straight magneto equipment.

It is the viewpoint of the operating men at Owosso that this method is the logical way to raise rates, as they find no trouble in convincing subscribers of the additional value to them of common battery service as compared with the "telephone with the cranks." As both types are operated simultantously with the same simple standard equipment, the change is made with the minimum expense and with the increased good will of the new subscribers.

Comparing the present total subscriber list of 1,791 telephones with the equipment cut over three years ago, speaks well for the success of the Kellogg universal at Owosso. Its records elsewhere, according to managers of exchanges in which it is installed, show equal success.

The Union Telephone Company was founded in 1899; its first switchboards being located in Alma, Ithaca and St. Louis, three towns situated in a triangle. The company was originally capitalized at $25,000. It now has a capital stock of $1,000,000.

Outside of Owosso, which is the only common battery plant of the company, the towns average three-section magneto switchboards. All of these old Kellogg switchboards are said to have really wonderful records for steady service with a very low up-keep cost.

There are at present over 13,000 magneto sets in service in all exchanges of the Union Telephone Company with additional connecting companies using about 3,000 more.

Western Electric New Executive Offices

The executive departments of the Western Electric Company, Incorporated, at New York moved on June 5 from 463 West street to new offices in the Telephone and Telegraph building at 195 Broadway.

The move was made necessary by the steady growth of the company's enginering departments which will occupy the space that has been vacated. The change also brings the executive departments in closer touch with the heart of New York's business district.

The local New York distributing department and the engineering and patent departments remain at 463 West street.

Bigger, better business coupled with the tendency of the electrical industry to center uptown has resulted

The Repair Shop Is Prepared for Rush Work.

The Telephone Office Reveals an Efficient Business System.

in a new location for the Western Electric Company's retail store in New York City. In its new quarters, in the Tilden building, 105 West 40th street, the store is situated but a stone's throw from Broadway, and is in the heart of a rapidly growing commercial section.

Because of more commodious quarters, a larger assortment of electrical goods will be carried at the new location. A complete line of electrical supplies, both staples and specialties, is carried in stock.

Advertising Copy for Independent Operators

TELEPHONE ENGINEER:—In the June issue of TELEPHONE ENGINEER I noticed an excellent editorial in which you urge the use of advertising by Independent telephone companies.

The company which I represent has always been a strong advocate of local advertising on the part of telephone companies and has from time to time produced series of advertisements for the use of customers from a mixture of both selfish and unselfish motives. I am enclosing proofs of a new series which have just been put out. In reading these over you will notice that they do not mention our company in any way, although illustrations show some types of Stromberg-Carlson apparatus.

It is our plan to furnish the electrotypes of these advertisements free to any telephone company provided that they will agree to use them in local advertisements within two months from the date they are received; and, furthermore, that they will instruct the publication in which the advertisements appear to send us copies of such papers. This condition is made so that the recipient will place some value upon the electrotypes which possibly might not be done if no conditions were imposed.

If you care to reproduce some of these advertisements in your paper I think it will do quite a little towards promoting the use of local advertising by telephone companies both large and small.—STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, Walter C. Freeman, Advertising Manager.

Telephone Convenience for Every Member of the Family
Double the service you now enjoy by putting a telephone in the room you frequent most.
The telephone rings in a distant part of the house and you answer it without leaving your chair—that is Telephone Convenience.
For full details just tell Central to give you our Extension Service Department.
Home Telephone Company

A Good Example of the Kind of Advertising Electrotypes Furnished to Customers by the Stromberg-Carlson Company.

Composition and Hard Rubber Parts

Under the above title, the Stromberg-Carlson Telephone Manufacturing Company's Bulletin No. 1013, Edition F-A, lists an interesting collection of receiver shells, ear caps, mouthpieces, for subscriber's and operator's transmitters, cord bushings, plughole blanks, dummy plugs, crank and key handles, service plugs, combination telephone parts, etc. All these products are illustrated with dimensioned line drawings.

The Kellogg Battery Saver for Magneto Sets

The instant success of the Kellogg battery saver or switchhook stop, which not only proved a great economizer of batteries, but also bettered the service on magneto party lines, has hastened the production of a slightly modified switchhook stop suitable for the older style Kellogg wall telephone. The first stop was designed for the Kellogg new type compact wall set with the short lever hookswitch only, but the great number of inquiries received, asking for a suitable "battery saver" to be fitted to the old style, long lever hookswitches of other Kellogg wall sets and which, incidentally, also fit many wall sets of other makes, prompted the Kellogg Company immediately to produce this new switchhook stop.

The principle of the modified stop is exactly the same as the first Kellogg patented battery saver, a slight difference in design taking care of the longer hookswitch movement. All of the advantages of the Kellogg hookswitch stop for compact telephones are applicable to the stop designed for the long lever switchhook telephone.

The most careful investigations and tests on existing rural lines throughout the country are said to prove an annual loss from battery wasted by mere "listeners" of more than a quarter million dollars. This amount represents 6 per cent interest on more than four million dollars, which sum, wisely expended, would go a long way toward improving the rural lines and making the service what it ought to be.

Near View of Kellogg Battery Saver. Automatically Returns to Listening Position When Receiver Is Put on Hook.

Investigation further proves, it is stated, that with the new uses for rural telephones being constantly discovered, this waste is increasing rather than decreasing, and also that much of the waste cannot be blamed on the ever-present "rubberneck," but attends the legitimate usages of the rural telephone. Thus when the weather reports, the market and general information of like nature is being given to a line of 15 or 20 patrons, battery is being consumed unnecessarily by every telephone.

In ordering, it should be stated whether the stops are for the Kellogg new type short lever hookswitch compact wall set, Code No. 1 stop, or for the older style long lever hookswitch wall telephone, Code No. 2 stop.

If the telephones are of the newest and most economical type with respect to battery consumption, the loss from 20 listening telephones is not less than 8.4 watts, and as this energy comes from dry batteries, the

desirable common battery service at higher rate, with-loss is equivalent to burning about 30 25-watt Mazda lamps on ten-cent current, not counting the cost of installing the batteries in the telephones.

The remedies proposed in times past for the correction of these evils have been numerous, but so cumbersome and unsatisfactory that they have never been applied to even a small fraction of 1 per cent of the existing rural telephones.

Kellogg Compact Wall Set With the Battery Saver.

The new Kellogg hookswitch stop is purely mechanical and can be installed by anyone outside any Kellogg telephone. It is sold at a nominal price and is claimed to be the final solution of the difficulties mentioned.

It consists of but one piece and one attaching screw. It automatically stops the hookswitch in an intermediate position before the battery circuit is closed. In making or answering a regular call, the user merely releases the stop with his left thumb, at the time he takes the receiver from the hook. When listening in, the receiver is removed without releasing the stop and the battery circuit is not closed unless the party desires to talk. In such event, the stop can be released by touching it once, after which the user can both listen and talk in the usual manner.

With this new device, a party endeavoring to carry on a conversation from a noisy location can "kill" his battery by merely touching the hook; and release his battery, when it comes his turn to speak, by merely touching the stop. Conversation may thus be had without inconvenience with locations too noisy to talk from in the usual manner.

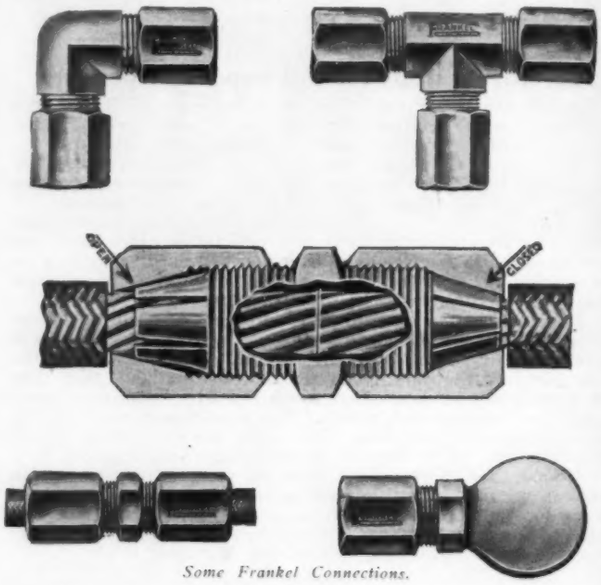
In giving market reports and bulletin service, the use of this device results in a two-fold benefit. First, the line is quiet instead of carrying a bedlam of noises as heretofore. Second, the talking party's voice current is more evenly distributed and is heard almost as plainly by the parties at the extreme end of the line as by those nearest the central office.

The installation of the new device on every telephone in a rural system represents such a trivial expense, while the economies and service benefits are so great, that a trial of the device would appear to be well worth while.

Improved Type of Solderless Connector

The electrical department of the Frankel Display Fixture Company has recently been incorporated under the title of the Frankel Connector Company, Inc., to carry on the manufacture of Frankel solderless connectors, Frankel testing clips and other specialties.

The illustration shows several types of the Frankel connector. The phantom view in the center shows the principle of the connector and how the design has permitted the use of the fewest possible parts to make a rigid connection. This simple construction, it is claimed, reduces the liability of the connector getting out of order.



Some Frankel Connections.

The company is also manufacturing a line of connectors for panel boards to replace soldered terminal lugs for front and back connections.

By using Frankel solderless connectors in place of the soldered type connection the makers claim a substantial saving of time as well as the added advantage of providing a joint that can be broken down without harm to the cable.

In the report containing the approval of the Frankel solderless connector, the Underwriters' Laboratories, Inc., states regarding a test: "At 1,000 amperes the soldered joint melted and dropped from the joint. The joint where the wires were attached to the (Frankel) connectors were unaffected by the test."

Answer the Telephone Without Leaving Your Work

A business man don't want to be interrupted in important work to travel through the store to answer every telephone call. An extension not only saves interruption but saves time.

Our Extension Service Department will gladly furnish full details on request.

Home Telephone Company

Another of the Stromberg-Carlson Advertising Cuts.

Brevities of the Business

The Activities of the Whole Telephone Field Told in Short Paragraphs

PERSONAL NOTES.

W. R. LaRoche, general superintendent of the plant in Pennsylvania for Bell Telephone Company, died at his summer home in Ocean City, New Jersey. Mr. LaRoche, who was fifty years old, had been ill for nearly two years and for almost a year had not been actively engaged in his duties for a year. He is survived by his widow, a son and daughter. Mr. LaRoche resided at Oak Lane Road and Fifth street, Philadelphia.

L. S. Lambert, wire chief for the Bell Telephone Company at Central City, Nebraska, has been promoted to the position of district wire chief with headquarters at Norfolk. He will be succeeded by F. H. Wilson of Omaha.

R. V. Stevenson, local manager for the Iowa Telephone Company at Red Oak, is taking charge of the Villisca office until the appointment of the successor of J. P. Lahr, recently resigned.

The sudden death of H. N. Foster, traffic superintendent of the Chicago Telephone Company, City Division, made necessary the following changes in organization: F. A. de Peyster, traffic superintendent, Suburban Division, was appointed traffic superintendent, City Division, succeeding Mr. Foster. B. R. Cooper, traffic chief, City Division, was appointed traffic superintendent, Suburban Division, succeeding Mr. de Peyster. R. W. Sullivan, division traffic supervisor, City Division, was appointed traffic chief, City Division, succeeding Mr. Cooper, and L. W. Layton, toll traffic engineer, was appointed division traffic supervisor, City Division, succeeding Mr. Sullivan.

District Manager James Northey of the Southern Bell Telephone Company, Charlotte, North Carolina, was presented with a thirty year button for service June 1, which was accompanied by a letter from the Southern Bell officials complimenting him on the excellent service and the efficient work he had done.

Mary Beddel, the oldest telephone operator in the state of Ohio, and probably in the United States, died recently. She was chief operator for the Citizens Telephone Company at Kilbourne, a small exchange in Ohio. She was seventy-six years old. Miss Beddel was stricken with heart failure while at her board.

W. R. Pierce, general manager of Alberta Government Telephones, Edmonton, Alberta, Canada, visited Chicago in the latter part of June and gave the TELEPHONE ENGINEER staff a pleasant half hour. Mr. Pierce was on his way east.

E. A. Saunders has tendered his resignation to take effect July 1, as manager of the Youngstown, Ohio, exchange of the Central Union Telephone Company. Mr. Saunders has taken the agency of the Fidelity & Casualty Company of New York City.

C. H. Lewis, who has been in charge of the Neponset, Illinois, telephone service, has resigned as manager of the system, his resignation taking effect at once. Mr. Lewis has been with the local system since the plant was installed about fifteen years ago. He is succeeded by David Risen of Bradford.

P. M. Hall of New Haven, Connecticut, has been made district plant supervisor of the Harrisburg division of the Bell Telephone of Pennsylvania, comprising forty-two counties in Pennsylvania and two in New Jersey.

A. Goehring, manager of the Central Union Telephone Company in Lewistown, Illinois, has handed in his resignation to take effect July 1.

Walter Cleary, manager of the LaFayette County Telephone exchange in Jefferson, Wisconsin, has resigned and accepted a position with the Bell Telephone Company in Milwaukee. He is succeeded by Roy Peters.

John J. C. Smith, inventor of machinery for making insulated wires and compression castings, died May 11, at his home, 146 Paulison avenue, Passaic, N. J. He was 79 years old. He was associated with leading American capitalists, manufacturers and inventors through his inventions, among them being Thomas A. Edison in his early days and Alexander Graham Bell, inventor of the telephone. He was instrumental in forming the first telephone company in America.

The Inter-State Telephone company is making extensive improvements in the lines at Eau Claire.

Frank Holt of O'Neill, Neb., has been granted a franchise for a telephone system at Riverton, and resigned his position with the O'Neill company to put in the new system.

The Mountain States Telephone and Telegraph Company is planning on building a telephone line from Worland into the oil fields.

A. W. Ostrander, of the telegraph department of the New York Central Lines, general offices, New York, has accepted a position with the American Telephone and Telegraph Company at 24 Walker street, New York.

BREVITIES OF THE BUSINESS.

ARIZONA.

A force of twenty-five men is working on the installation of equipment in the new building of the Mountain States Telephone Company on East Pennington street, Tucson. It is not expected that the company can commence to move into the new quarters until August 1.

ARKANSAS.

Construction of the line between Yellville and Rush will shortly be started by the Arkansas-Missouri Telephone Company. This line will give Rush long distance connection.

The Arkansas and Oklahoma Telephone Company of Cove, Hot Springs county, has surrendered its charters.

CALIFORNIA.

The rebuilding of the telephone line of the Pacific Telephone and Telegraph Company between Merced and Yosemite and other mountain points, which has been in progress the past five weeks, is nearly completed. The most extensive repairs and replacements were made at Jasper Point, where many poles had to be replaced on account of the great number that had been destroyed by forest fires and rock slides. Extensive repairs have been made also on the line between Merced Falls and Hornitos. A toll station will be established at Mast, the Yosemite Valley railroad station at Horseshoe Bend ranch, within the next thirty days.

Arrangements are being made to install a new switchboard in the exchange at Sanger.

The biggest part of the work that is outlined by the Pacific Telephone & Telegraph Company in Fresno is to remove the poles and aerial structure on Forthcamp avenue, from the J street curve to Olive avenue, and to put in underground conduit and cable from the central office out the J-K alley to Voorman. Between Voorman and Belmont avenue new underground conduit and cable will be laid. The estimate on this work is $29,640. There is also much work to be done in the central office, and $1,100 has been appropriated for this part of the improvements. Long distance loops will be installed from Dos Palos to Mendota, Fresno to Jamison and from Fresno to Kerman. This work will cost $4,390, and will be completed within five months. Two sections of switchboard will be installed in the central office at Clovis.

Plans, specifications and the contract for the erection of a $6,760 telephone building in the town of Gilroy have been filed in the office of County Recorder D. J. Flannery. The Gilroy Investment Company will own the building and it is to be constructed within ninety-five days after the date of the filing of the contract.

The Pacific Telephone and Telegraph Company are soon to begin placing their wires on Fifth street, between Salem and the S. P. tracks, Chico, underground. Conduits for the reception of the wires are already in hand, having been laid when Fifth street was paved. The work is to be completed within 150 days.

CANADA.

The Addison Rural Independent Telephone Company, Ltd., have secured a charter.

Tenders have been called by the British Columbia Telephone Company for the construction of a new office building at Nelson, on a site almost immediately opposite the company's present exchange on the west side of Stanley street. The plans call for a one-story building of brick and stone or Kootenay marble, with concrete foundations, the frontage being 30 feet and depth 90 feet. It is believed that with the erection of the new home the central energy system, to which the citizens have been looking forward for some time, will be installed.

IDAHO.

The Mountain States Telephone & Telegraph Company of Nampa has purchased a new runabout motor car to handle the repair and trouble work.

ILLINOIS.

T. Z. Creel, of Macomb, manager of the Western Illinois Telephone Company, met with the Commercial Association of Camp Point to discuss the local telephone situation. The meeting resulted in an arrangement whereby Camp Point is to have restored to her a very valuable service down to Coatsburg, Columbus and all through the west and southwest country, which was discontinued about two years ago, when an old line making the connection was permitted to go down.

Several changes among the operators at the Galva telephone office have taken place. Mrs. Fred Gamble of Kewanee has taken the position of chief operator, formerly held by Miss Lillie Matson, who will have the night work at the local office. Mrs. Esther Osbloom, acting as night operator for the past year or more, has resigned, and also Miss Margaret Matson. Miss Lucille Kennedy of Springfield has taken Miss Matson's place on the day shift.

The Crescent Telephone Company in Hillsdale is adding a room on the east side of their building which will be used as an office and switchboard room. They are also contemplating installing a new switchboard.

The main floor of the telephone building in Princeton is being remodeled and as soon as the changes are completed, it will be occupied by the general business offices of the Bureau County Independent Telephone Company.

The special city election held May 23 to ascertain whether or not Astoria should purchase the Astoria Telephone Exchange and operate it as a municipal plant, resulted in favor of the city buying it, by a big majority.

The new building of the Bureau County Independent Telephone Company is now about completed and will be occupied within a short time. It is a modern one-story structure fireproof with a basement beneath. The basement will be used as a work and store room while the first floor will be occupied by the central station and manager's office. A public telephone will also be installed on the first floor. The new telephone building is located on the north side of town on the corner of Main and Locust streets.

3606 Ogden avenue, Chicago, 4-story brick telephone exchange, Chicago Telephone Company, 212 West Washington street, $40,000.

INDIANA.

The Home Telephone Company has the vitrified viaduct for its new cables laid on the south side of its building on Maple avenue, Nobleville. These cables will extend from the alley between Ninth and Tenth streets on Maple avenue west nearly to the alley between Eighth and Ninth streets. The viaduct is covered with concrete and the cable will be drawn through it with wires after it is completed.

Jeffersonville Home Telephone Company, Jeffersonville, filed final certificate of dissolution.

Contracts have been let for the installation of new equipment for the Commercial Telephone Company in Warsaw. The Garford Telephone Manufacturing Company of Elyria, Ohio, were the successful bidders for the switchboard, while the remainder of the equipment contracted for is to be furnished by the Western Electric Company of Chicago.

Belle Union Telegraph Company, Belle Union, capital $1,000; telephone lines and exchanges; directors, Frank B. Allee, Van Buren McCammack, William Pickens, Harvey McClellen, George Appleby, Clarence E. Wallace, E. N. Larkin.

IOWA.

June 3 the Washington Telephone Company moved their office into the new building.

A new telephone has been installed in the Farmer and Traders State Bank in Leon for the convenience of their patrons.

A force of men have been started at work removing 9,000 feet of old cable and about 200 poles in Ottumwa. The new cable will be laid in tile conduits in the alley between Main and Second streets from Wapello to McLain streets. When completed this will be about three-fourths of the work to be done by the Iowa Telephone Company in this part of the town.

The Southeastern Iowa Telephone Association held a convention in New London June 2.

Iowa Telephone Company, Des Moines. Renewed articles and increased capital from $10,000,000 to $15,000,000. C. E. Yost, president; J. W. Christie, secretary.

KANSAS.

The Misouri & Kansas Telephone Company is having trouble in putting in the foundation and basement of their new building at First and Lawrence streets, Wichita. Water has interfered with the work and it has been necessary to resort to the sinking of steel caissons inside of which the concrete piers are to be constructed. After the caissons are sunk in the sand a pump removes the sand and water from the inside of them so the piers can be put in.

Marquette Farmers' Telephone Company, Marquette; capital stock, $1,500.

The People's Home Telephone Company have installed automatic self-closing fireproof doors and windows which close automatically when the outside temperature reaches a certain degree in their exchange building in Leavenworth.

The observation board in the Hutchinson exchange of the Bell Telephone Company is being enlarged.

The Hanover Telephone Company, Hanover, will in a short time distribute their new directories.

KENTUCKY.

It was unanimously voted by the council that the Cumberland Telephone & Telegraph Company be requested to remove all telephone poles off of Church, Main, Walnut, Fourth to bridge, and Lake streets, Fulton.

Pleasant Grove Telephone Company, Pleasant Grove; capital $500; incorporators: O. C. Kennedy, W. P. Walker and T. P. Liles.

The Maysville exchange has installed the central energy system.

MARYLAND.

With a view to building a new telephone exchange in the northwestern part of the city the Chesapeake and Potomac Telephone Company have just bought four lots, Nos. 67, 68, 90 and 91 in Park Manor, Baltimore. The tract has a frontage of 100 feet on Kate avenue and a depth of 300 feet to Borman avenue.

MASSACHUSETTS.

New England Telephone Company, regular quarterly dividend of 1¾ per cent, payable June 30 to stock of record June 21.

MICHIGAN.

The United Home Telephone Company in Hart has completed its new home. It is of rough finished brick and is in charge of Joe Yarnell.

Custer Telephone Company, Custer, $1,000.

East Hamilton & North Grout Roadway Telephone Company, Gladwin, $1,200.

The Bell Telephone exchange in Muskegon will be discontinued June 1 as a result of an interchange of territory between the United Home Telephone Company and the Bell. The United Home Company pays $150,000 in preferred stock and bonds for the Bell properties acquired in Muskegon, Newago, Oceana and Ottawa counties.

Work has already been begun by the Manistee exchange of the Michigan State Telephone Company in removing the Citizens' phone toll line to Scottville and Ludington from the Briny Inn into the Manistee Bell station. Through a merger of the Bell and Citizens interests, the Bell has gained control of all the territory north of Ludington.

Manager Stevens, of the Benton Harbor division of the Michigan State Telephone Company, announced that $10,000 has been advanced by the state headquarters for expenditure on the expansion of the local service. Rebuilt three years ago, the demands upon the offices have so grown that today there is need for yet larger facilities. During the past five months the business has increased 20 per cent. It is estimated that city calls now number over 15,000 per day. A total of 40 operators are now employed.

Managers and wire chiefs of the Bell Telephone Company met in Lansing, at the Hotel Downey for the purpose of discussion of general conditions and matters affecting service. Nine counties were represented in the delegation. The meeting, which is an institutional affair held regularly, is for interchange of ideas, experiences and suggestions.

MINNESOTA.

The telephone exchange in Morgan is being moved from its present location to the State Bank building. Two thousand feet of new cable will be used in replacing the old cable and wires.

Telephone extensions to each room of the North Side Commercial club in Minneapolis has just been installed.

The directors of the Tri-State Telephone & Telegraph Company, Minneapolis, have declared the fifty-second quarterly dividend of one and one-half per cent (six per cent per annum) on the outstanding stock of the corporation. This dividend will be payable June 1, 1916, to stockholders of record at the close of business on May 19.

The Northwestern Telephone Exchange is building a frame addition to their exchange building at northeast corner of Bryant avenue and Twenty-first avenue N, Minneapolis, to cost $1,000.

MONTANA.

The Mountain States Telephone Company will soon commence the work of rebuilding its local exchange and repairing its

NEBRASKA.

The Nebraska Telephone Company in Bridgeport has completed its improvements. A new switchboard has been installed and new cable and wires have replaced the old. Another operator has been added to the staff.

The Lincoln Telephone and Telegraph Company has inaugurated a series of monthly meetings of wire chiefs at the various points in its territory. The plan is for the meeting to be held each month at a town where the wire chief is given no advance information of their coming. The men go over the plant with a critical eye, complimenting their host on conditions which strike them as contributing unusually to the efficiency of the plant and calling attention to improvements which they think might be made. The first meeting of the series was held at Superior.

The addition of four floors to its present four-story building on Douglas street, and its extension southward sixty feet to the alley, is the plan of the Nebraska Telephone Company in Omaha which will be put into operation early this fall, according to the announcement made by W. B. T. Belt, vice-president and general manager of the company. The extension to the south will be eight stories in height to conform with the rest of the building, which will have an eight-story frontage on Douglas street. The new additions will be used exclusively for office purposes, the two downtown central offices, Douglas and Tyler, being located in the company's building at the corner of Eighteenth and Douglas streets. The estimated cost of the addition and extension will be about $200,000.

There has been considerable talk at different times of the two telephone systems in David City consolidating. An adjourned meeting will be held on June 27, when the sale will probably be completed, or an option taken by the Lincoln folks and the matter put up to the people of David City to decide whether they want one or two systems.

The exchange district managers' meeting, held for three days in the office of the Nebraska Telephone Company at Norfolk, closed June 15 after an interesting session in which many topics of special interest to the district managers were discussed.

The Nebraska Telephone Company, Omaha, has distributed 54,000 new telephone directories to cover the period of June to September, inclusive.

The farmers of Grant have remodeled their line.

NEW YORK.

In order to provide for the big increase in service in the Ridgewood section the New York Telephone Company will erect in that section the largest central station in Queens. It will be located at the southwest corner of Gates and Fairview avenues, will be of brick, 46x82 and eight stories high and will cost $150,000.

Ferndale Telephone Company, Ferndale: capital, $5,000; treasurer, T. M. Moyer, Ferndale.

McKenzie, Voorhees & Gmelin, architects for the New York Telephone Company, have filed plans for adding one story to the six story telephone exchange building at 346 to 352 West Seventeenth street at an estimated cost of $40,000 and three stories to the three story telephone exchange at 126 to 130 Orchard street, New York, thereby making it a six story structure, at an estimated cost of $60,000.

NORTH CAROLINA.

The Western Electric Telephone Company have about completed their work of rebuilding their lines at Greenville and all the city phones are now on cable lines. The cables that have been installed are large enough to handle the business for many years to come.

All telegraph and telephone wires are to be put underground within the fire limits of Wilson territory embracing the principal business section, and the work is to begin not later than August 1 and completed by January 1, 1917. This is the final decision of the board of commissioners and the telegraph and telephone companies will prepare for the work at once. All wires and poles will be taken from the streets and the city will also remove the electric light wires, placing them in conduits. This work is preparatory to the grading and paving of the streets.

NORTH DAKOTA.

The fifth rural telephone company operating lines radiating from Bismarck was organized by W. E. Reeves, Bismarck manager for the North Dakota Independent Telephone Company, June 2. It will be known as the Naughton Telephone Company, serving Naughton township and bringing in closer touch with Bismarck a number of the most influential and most prosperous farmers in Burleigh county. The officers of the new telephone company are C. A. Carlson, president; C. A. Johnson, vice-president; A. Johnson, secretary, and August Solberg, treasurer. The wire, poles and other materials have been ordered, and construction work should begin within a very short time.

The line will extend 18 miles northeast of Bismarck.

The Williams County Mutual Telephone Company established connections with Wildrose, north of Ray, the Ray company building the line about twelve miles north to meet an extension of the line which was erected by the Wildrose company.

A petition was circulated among merchants of Hazelton for funds with which to purchase eight miles of wire for the extension of the telephone line out in the river country.

The Farmers' Southwestern Telephone Company has been organized and incorporated to supply telephones to a number of farmers southwest of Jamestown. Some fifteen places will be connected up. A charter has been secured, and incorporation effected by the election of the following officers: N. H. Newling, president; E. P. Lenton, vice-president; H. P. Lenton, secretary, and L. P. Murphy, treasurer. The capital stock is placed at $4,800 and 24 miles of line will be built, extending from Sydney to Jamestown.

OHIO.

Officials of the United Telephone Company in Bellefontaine are considering the installation of a new switchboard.

The Wayne County Telephone Company sustained a severe loss when the heavy cable from the American House to the Pennsylvania depot, in the alley south of Liberty street, fell to the ground, cutting off every wire connection along the way, and putting practically all of the telephones in the southeast part of the city out of commission.

The local office of the Central District Telephone Company, more familiarly known as the Bell Telephone Company, East Liverpool, is to be remodeled and enlarged to the amount of $30,000, exclusive of all electrical work and wiring. The contract for the improvement has been let to the Potters Lumber Company. Another story is to be added to the present two-story building, and a two-story 30-foot extension is to be erected at the rear of the present structure. The entire improvement will be of brick fireproof construction. The building will be completed by December 1.

The telephone poles and overhead wires remaining in Tuscarawas street, Canton, will be removed by June 20 or near that date according to Safety Director Kunkel.

The Damascus Telephone Company has purchased a complete new outfit for their central office in Damascus. This is to be installed within thirty days to supplant the old system now in use. The new board will have 200 drops and is of the most modern make with all improved appliances.

Plans providing for the enlargement of the Youngstown central office plant of the Ohio State Telephone Company there so as to almost double in switchboard capacity, received the approval of the company's chief engineers at Columbus, according to announcement by Manager G. G. King. The work will be started about July 1. The plan provides for the extension of the present exchange building to the extrême limit of the company's property at 21 East Rayen avenue, the addition to conform to the present fireproof structure.

Arrangements are being made by the Ohio State Telephone Company to give automatic phone service to Pine Hollow and Brownlee Woods. Work of stringing cables from the Youngstown lines has been started.

The directors of the Home Telephone Company, Fremont, at a meeting recently held, decided to employ an architect who is to make plans and specifications for the remodeling of the Horn homestead recently purchased by the company. Manager George Seaman was instructed to complete details in connection with the plans and just as soon as the directors approve plans, bids will be asked for and the work awarded.

OKLAHOMA.

The Keowee Telephone Company, Kremlin. W. F. M. Beck, R. W. Buck, John Rauch, C. E. Frost, of Kremlin. Capital stock, $300. Certificate sent to John Rauch, Kremlin.

Employes of the Pioneer Telephone and Telegraph Company of Tulsa were entertained June 19 on the fourth floor of the Pioneer building to celebrate the opening of the new cafeteria and rest room, which has been established for the women employes. More than 200 men and women were guests of the company.

The Goltry Independent Telephone Company, Goltry. Incorporators: W. C. Nelson, C. F. Preston, C. E. Kisling, H. J. Storms and J. R. Vice, Goltry. Capital stock, $2,500.

OREGON.

The Stayton Co-operative Telephone Company elected as directors: Henry Smith, F. A. Bell, I. J. Boedigheimer, Byron Denny and W. E. Chrisman.

The Pacific Telephone and Telegraph Company will make extensive improvements in Klamath.

Sheridan-Willamina Telephone Company, Sheridan. Capitalization, $5,000. Incorporators: I. F. Daugherty, M. W. Potter, G. A. McCulloch.

toll line from Twin Bridges to Cedar Hall Junction. Two carloads of poles have already arrived.

Coos and Curry telephone system being largely rebuilt.

PENNSYLVANIA.

The Bell Telephone Company has a force of men in New Castle replacing the poles of its lines between the Seventh ward and the upper part of the city with new and stronger poles. The work is progressing in a rapid and satisfactory manner.

Employes of the telephone companies were kept busy repairing the damage wrought by the severe electrical storm on June 3 in Honesdale. Near Canaan a large number of wires were down and considerable work was necessary before service could be restored in that locality.

The Boy Scouts delivered more than four thousand directories for the Consolidated Telephone Company in Allentown and vicinity.

Mt. Pleasant subscribers of the old Mutual Telephone Company will be given a pleasant surprise as soon as the Tri-State people get in their new system on which they are at work in the Zuck building.

The Central District Telephone Company has established connections with the Vandergrift Telephone Company which operates at Vandergrift. This will give Bell subscribers access to fifteen hundred telephones in and around Vandergrift where formerly there was only a toll station connection. The subscribers of the Vandergrift Telephone Company will be able to reach every point in the Bell system.

The Chelton Trust Company has sold to the Bell Telephone Company premises on the northwest side of Maplewood avenue, 161 feet southwest of Germantown avenue, 14 feet 9 inches by 64 feet 3 inches, together with a lot in the rear, 50 feet by 110 feet 8 inches, for $17,500. The lots adjoin the exchange building of the company, on Chelten avenue, west of Germantown avenue, Philadelphia.

Announcement is made that the American Telephone and Telegraph Company has established district plant headquarters in the Arcade building, Harrisburg, and will be in charge of P. M. Hall, district plant supervisor. Mr. Hall's territory will extend throughout the Harrisburg division of the Bell Telephone Company of Pennsylvania, comprising forty-two counties in Pennsylvania, and two in New Jersey. Heretofore all maintenance and construction work on the lines of the American Telephone and Telegraph Company was handled from the Philadelphia office.

SOUTH CAROLINA.

The Gaffney telephone plant may install the central energy system. A petition is being circulated among the patrons, and as soon as a majority of them ask for the new system the matter will be acted upon by the town council, and if this action is favorable the matter will then be referred to the railroad commission.

SOUTH DAKOTA.

Articles of incorporation have been filed for the Straburg Mutual Telephone Company, at Craven, Edmunds County. Capital, $5,000. Incorporaotrs: Mike Schumacker, Jr., Joseph Cauer, Michael Biegler, Michael Fischer.

Keldron citizens have been considering the proposition of organizing a rural telephone company and the move seems to be unanimously favored. Final steps will be taken at a subsequent meeting.

The organization of the Farmers' Mutual Telephone Company of Little Oak township is well under way and will be a reality in the near future.

The Table Land Telephone Company, at Edgemont. Capital, $2,500. Incorporators: Michael Carlen, H. A. Helsel, John Manke.

The Westover Telephone Company, Murdo. Capital, $4,000. Incorporators: W. E. Hollenbach, C. H. Kendall, Charles Brown.

A deal was closed recently whereby the Webster Telephone Company disposed of the Webster exchange and farm lines to the Dakota Central Telephone Company, taking over the property on June 1. The deal was made by David Williams for the Webster Telephone Company, and J. L. W. Zeitlow and W. Bickelhaupt, president and secretary, respectively, of the Dakota Central Telephone Company. E. E. Micael, the present manager for the Webster Telephone Company, will retain the management until August 1.

The annual stockholders' meeting of the Hansen Telephone Company in Howard was recently held and the secretary's report for the first four months of 1916 showed a large dividend. It was decided, however, to add the profits to the reserve for the improvement and development of the line. The officers were all re-elected.

The White Rock Independent Telephone Company, White Rock, is now out of debt and at the recent meeting the first dividend declared which amounted to 7½ per cent. While the company is still young it has made great advancement during the last few years and it is planned to extend several lines this summer. The officers at the recent meeting who are to serve for the coming year are: President, M. A. Leversee; secretary, M. W. Sanders.

TEXAS.

The city council recently granted a thirty-year franchise to the Texas Telephone Company, Temple, which will merge with the local exchanges of the Southwestern and United Telephone Companies. The franchise provides for a maximum rate of $3.50 a month for business, $2 for residence phones and harmonic lines $1.50. A franchise tax of $600 annually will be paid the city with additional tax of 25 cents a phone for excess of 2000 phones. Underground conduits will be installed in business streets with gradual placing of all wires underground in districts thickly populated.

Certificate of dissolution has been filed by the Farmers' Union Telephone Company of Alto.

VIRGINIA.

Unionville Telephone Company, Unionville. Maximum, $5,000; minimum, $2,000. L. D. Walker, president; G. M. Waugh, secretary, both Unionville, Va.

Telephone Attachment.—Automatic Phone Attachment Company, 803 Washington street, Suffolk; capital $5000, incorporated; Clarence E. Booker, president; A. C. Volper, vice-president and secretary; M. K. Kendrick, manager; manufacture automatic telephone attachment, patented by Mr. Booker.

WASHINGTON.

Wahkiakum County Co-operative Telephone & Telegraph Company, Cathlamet; $1,000; C. C. Schmand, George W. Wood, R. Rice, F. Smalley, J. H. Harrison and W. W. Head.

WISCONSIN.

The Iron Belt Telephone Company has a large crew of men at work erecting telephone poles in Hurley. The company plans to have the line completed by the latter part of July.

Two copper circuits are being strung by the Wisconsin Telephone Company from Stevens Point to Grand Rapids. No new poles will be erected for the new circuits, but the old six-pin cross arms are being replaced with ten-pin.

Managers and chief operators of the Wisconsin Telephone Company in cities of the Appleton district held a meeting in Green Bay.

Poles have been put in and wires are now being strung to connect twenty-four telephones in Armenia, Juneau County, with the Adams County Metallic Telephone Company, an independent farmers' phone company, which now has over 300 phone connections.

The Wisconsin Telephone Company will spend $350,000 for improvements to its service and plant in Milwaukee and $96,000 for additions and repairs to the plants in Wisconsin, outside of Milwaukee. These appropriations were made at the quarterly meeting of the board of directors, held in the main office on Fifth street. The directors present were B. E. Sunny, Alonzo Burt, H. F. Hill, Otto A. Falk, Julius O. Frank, Oliver C. Fuller, and H. O. Seymour. It was announced that the building at 414 Broadway would be wrecked early in July and that a $700,000 general office and operating building would be erected on this ground.

The Washburn exchange of the Wisconsin Telephone Company, according to a statement just given out by the company, has shown a larger growth for the past year than any other exchange in the state, a gain of 143 per cent. The company has made a careful and detailed study of conditions, and plans for the expenditure of over $25,000 in the improvement of the exchange. It has leased the entire upper floor of the building now under construction and will occupy it September 1. The company will also install three miles of cable and will remove all poles from the main business street.

The Marshfied Telephone Company has made a preliminary move for the improvement of their system by placing the telephone wires underground, it being the intention to later carry the entire city lines under the surface.

WYOMING.

A telephone line is being strung over the Basin for the purpose of uniting the various fields, camps and offices of the Ohio Oil Company and the Illinois Pipe Line Company. The linemen strung a line into the main office of the Ohio and thence to the Torchlight camp.

As soon as the weather permits, the Mountain States Telephone and Telegraph Company will build an additional circuit from Cheyenne to Rawlins, a distance of 175 miles. The toll line from Casper to Lander will be re-routed and rebuilt.